2004 ACCESSORIES & EQUIPMENT

Instrument Panel, Gages, and Console - Blazer/S-10, Jimmy/Sonoma

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Console to the Vehicle Retainers	10 N.m	88 lb in
HVAC Switch Panel Screws	1.9 N.m	17 lb in
Instrument Cluster Screws	1.9 N.m	17 lb in
Instrument Panel Accessory Trim Plate Screws	1.9 N.m	17 lb in
Instrument Panel Compartment Bezel Screws	1.9 N.m	17 lb in
Instrument Panel Compartment Door Hinge Screws	1.9 N.m	17 lb in
Instrument Panel Compartment Door Striker Screws	1.9 N.m	17 lb in
Instrument Panel Lower Support Bolt	11.5 N.m	102 lb in
Instrument Panel Pivot Bolts	11.5 N.m	102 lb in
Instrument Panel Sound Insulator to Cowl Panel Screws	1.9 N.m	17 lb in
Instrument Panel Sound Insulator to Floor Ducts Screw	1.9 N.m	17 lb in
Instrument Panel Sound Insulator to Heater Assembly Screw	1.5 N.m	13 lb in
Instrument Panel Sound Insulator to Instrument Panel Screws	1.9 N.m	17 lb in
Instrument Panel Sound Insulator to Knee Bolster Screws	1.9 N.m	17 lb in
Instrument Panel Upper Support Screws	1.9 N.m	17 lb in
Knee Bolster Bracket Bolts (Hex Head)	6.3 N.m	56 lb in
Knee Bolster Bracket Nuts (Hex Head)	10 N.m	89 lb in
Knee Bolster Bracket Screws (Hex Head)	1.9 N.m	17 lb in
Knee Bolster Screws (TORX(R) Head)	9 N.m	81 lb in
Knee Deflector Nuts	10 N.m	89 lb in
Left Side Instrument Panel Sound Insulator to Accelerator Bracket Nut	4 N.m	35 lb in
Overhead Console Screws	1.9 N.m	17 lb in

Sunroof Console Mounting Bracket Screw	1.9 N.m	17 lb in
Sunroof Console Screw	1.9 N.m	17 lb in
Upper Steering Column Support Bolts	25 N.m	18 lb ft
Upper Steering Column Support Nuts	25 N.m	18 lb ft
Universal Transmitter Module Screws	1.9 N.m	17 lb in

FUEL LEVEL SPECIFICATIONS

The information in this table is intended for use with the **J 33431-C** Signal Generator and Instrument Panel Tester. See **Special Tools and Equipment** . The fuel level sensor values represent the test values to be used on the Signal Generator to drive the fuel gage display to the indicated positions. Vehicles that require more than one fuel level sensor calculate gage position from many possible resistance combinations of fuel levels between the two tanks. Therefore, the values in the table may not correlate directly to readings taken from the vehicle primary or secondary sending units.

The values in the table are approximate values based on information obtained from properly operating vehicles. Actual results may vary slightly.

Fuel Level Specifications

Fuel Gage Display	Resistance	Fuel Level	Fuel Remaining	Voltage
18 Gallon Tank (4-Door Utility)				
E	48-63 ohm	2-15%	0-10.2 L (0-2.7 gal)	0.9 V
1/4	88-99 ohm	33-38%	26.5 L (7.0 gal)	1.5 V
1/2	122-132 ohm	53-58%	39.8 L (10.5 gal)	1.7 V
3/4	155-165 ohm	68-78%	52.6 L (13.9 gal)	2.0 V
F	210-235 ohm	90-95%	60.6-68.2 L (16-18 gal)	2.4 V
Low Fuel Indicator On	67 ohm	18-20%	13.23 L (3.5 gal)	1.1 V
Low Fuel Indicator Off	73 ohm	22-24%	14.38 L (3.8 gal)	1.2 V
19 Gallon Tank (2-Door Utility)				
E	55-60 ohm	11-16%	12.1 L (0-3.2 gal)	0.9 V
1/4	98-103 ohm	35-40%	27.25 L (7.2 gal)	1.4 V
1/2	130-135 ohm	55-60%	42.4 L (11.2 gal)	1.7 V
3/4	174-179 ohm	77-82%	57.54 L (15.2 gal)	2.0 V
F	200-235 ohm	90-100%	70.79 L (18.7 gal)	2.3 V
Low Fuel	66 ohm	19-21%	14 L (3.7 gal)	1.0 V

Indicator On				
Low Fuel Indicator Off	71 ohm	22-24%	15.9 L (4.2 gal)	1.1 V
18.5 Gallon Tank (Pick-up)				
E	48-63 ohm	11-16%	11.4 L (3.0 gal)	0.9 V
1/4	82-86 ohm	35-40%	26.5 L (7.0 gal)	1.4 V
1/2	122-126 ohm	55-60%	36 L (9.5 gal)	1.7 V
3/4	164-168 ohm	77-82%	51.1 L (13.5 gal)	2.0 V
F	205-230 ohm	90-100%	64.4 L (17.0 gal)	2.3 V
Low Fuel Indicator On	66 ohm	19-21%	13.2 L (3.5 gal)	0.98 V
Low Fuel Indicator Off	70 ohm	22-24%	15.1 L (4.0 gal)	1.06 V

AMBIENT AIR TEMPERATURE SENSOR RESISTANCE

Ambient Air Temperature Sensor Resistance

Temperature		Resistance	
Metric	**English**	**Minimum**	**Maximum**
-35°C	-30°F	206650 ohm	250550 ohm
-18°C	0°F	79850 ohm	98850 ohm
0°C	32°F	30550 ohm	35050 ohm
27°C	81°F	11150 ohm	11250 ohm
33°C	92°F	8450 ohm	8550 ohm
42°C	107°F	5950 ohm	6050 ohm
48°C	119°F	4450 ohm	4550 ohm
55°C	131°F	3450 ohm	3550 ohm
60°C	140°F	2450 ohm	2550 ohm

SCHEMATIC AND ROUTING DIAGRAMS

INSTRUMENT CLUSTER SCHEMATICS

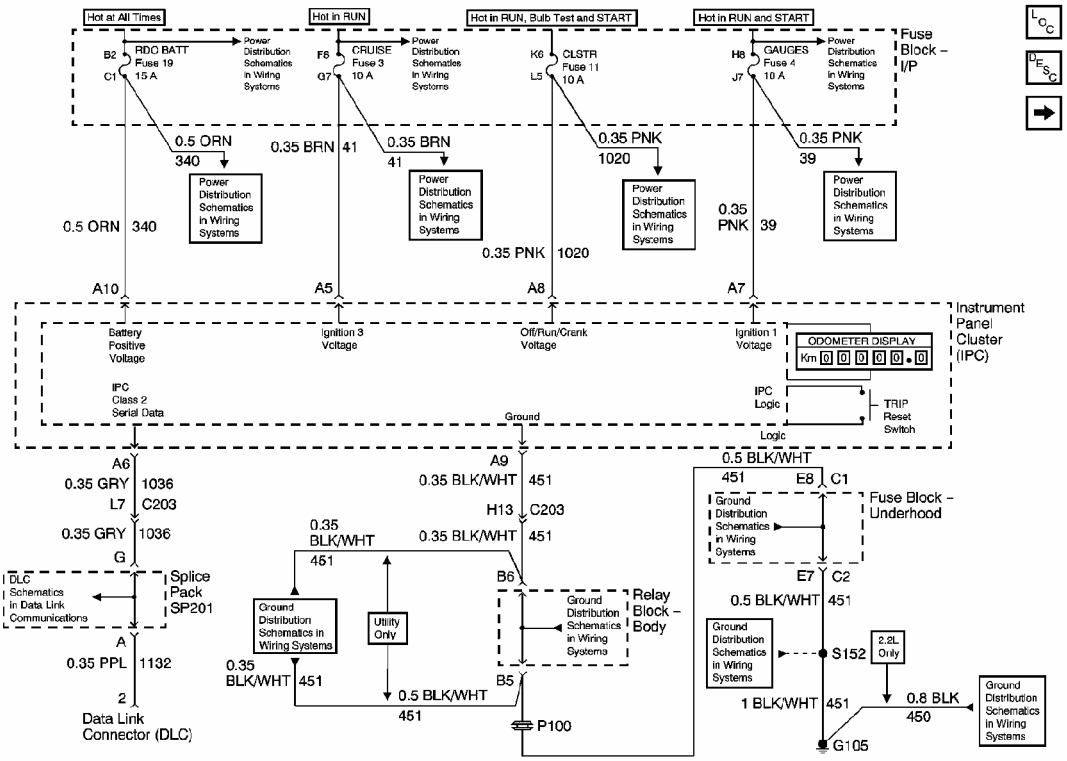


Fig. 1: Power and Ground
Courtesy of GENERAL MOTORS CORP.

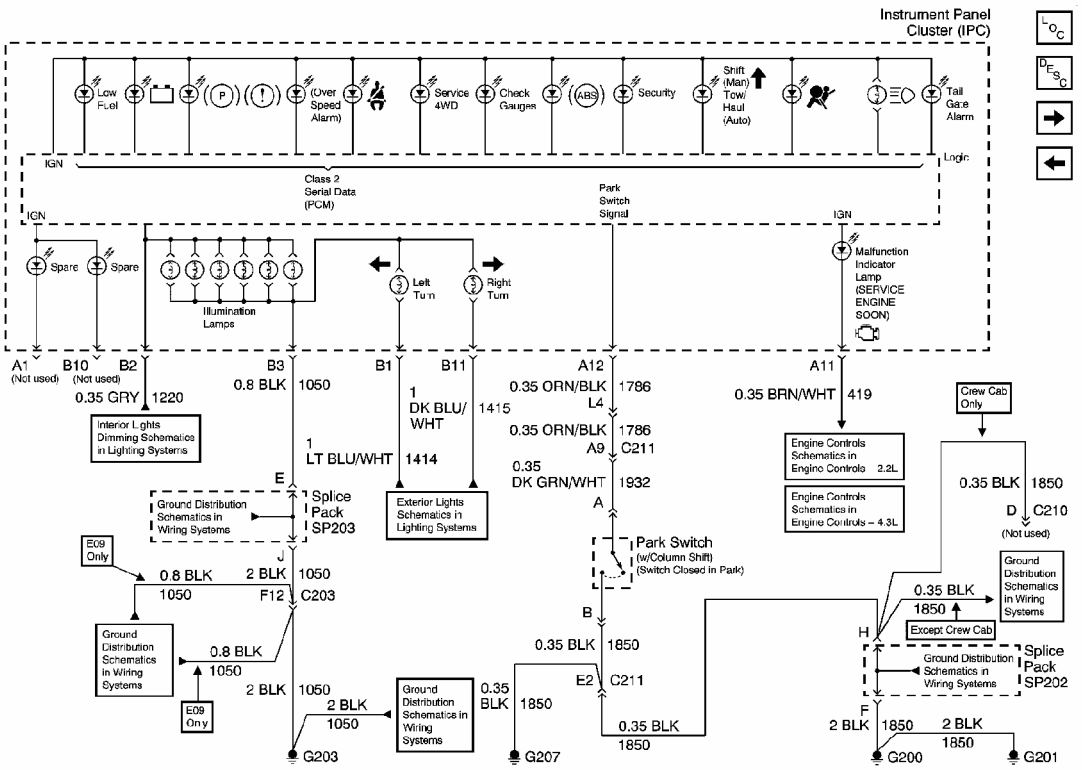


Fig. 2: Indicators
Courtesy of GENERAL MOTORS CORP.

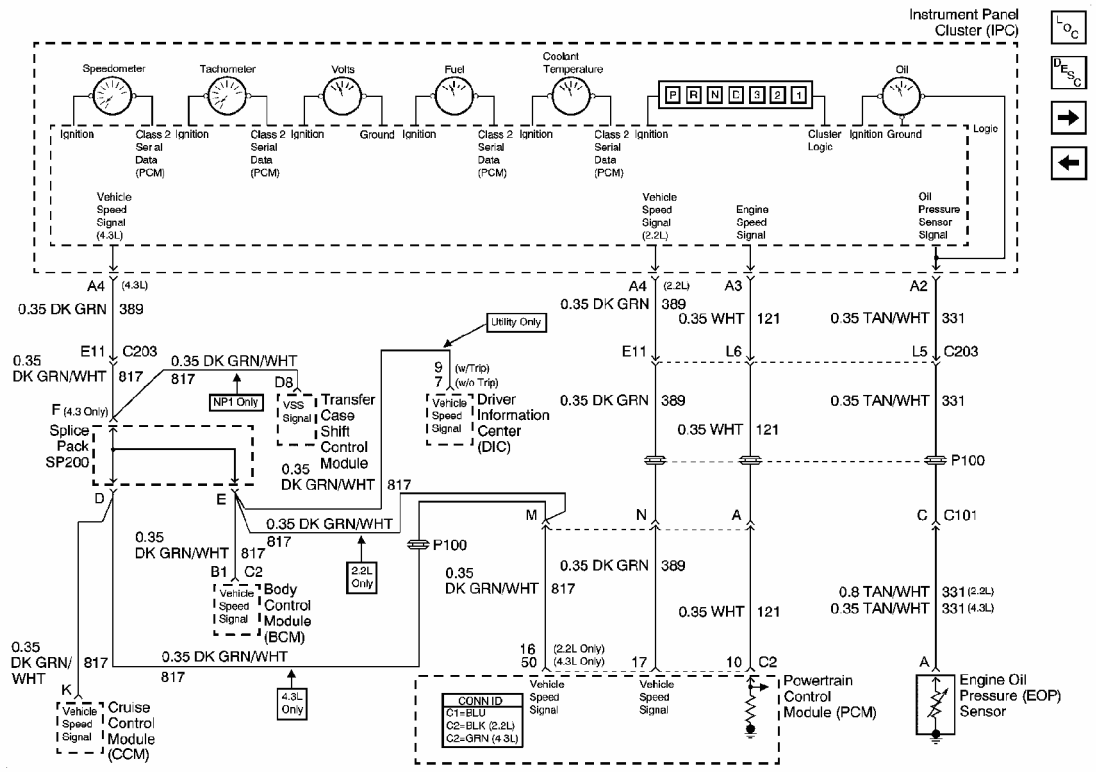


Fig. 3: Gages
Courtesy of GENERAL MOTORS CORP.

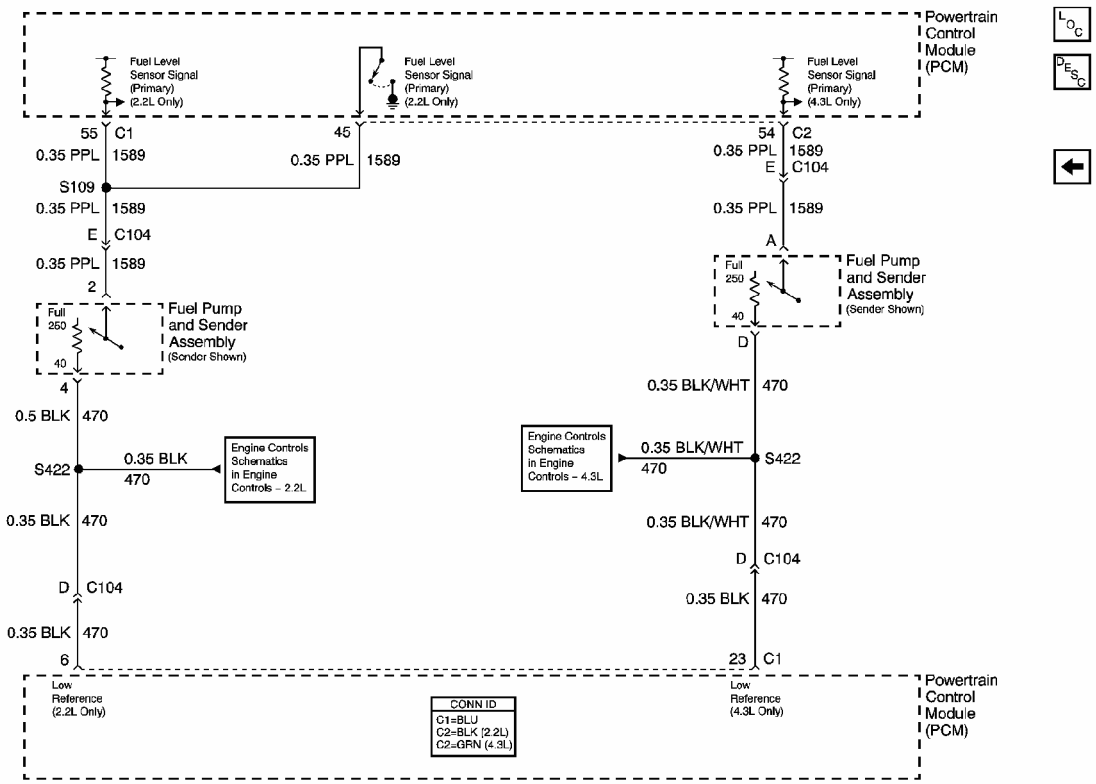


Fig. 4: Fuel Level Sensor Signal
Courtesy of GENERAL MOTORS CORP.

DRIVER INFORMATION SYSTEM SCHEMATICS

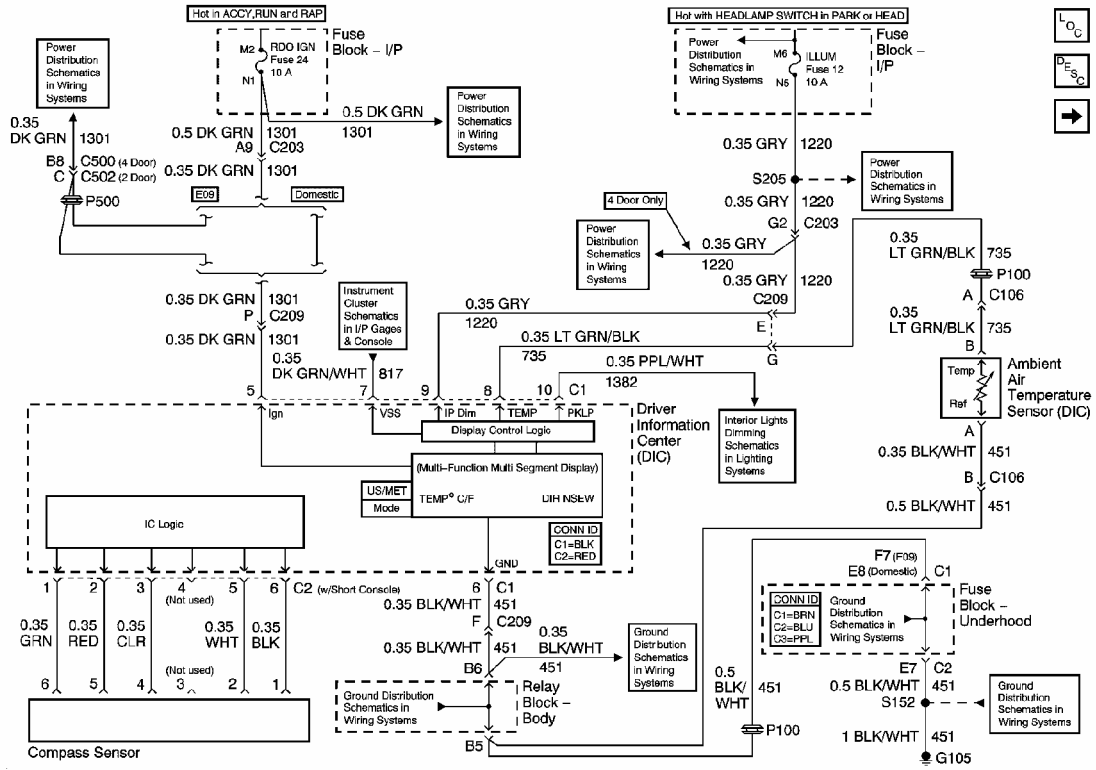


Fig. 5: Power and Ground - w/o Trip Computer
Courtesy of GENERAL MOTORS CORP.

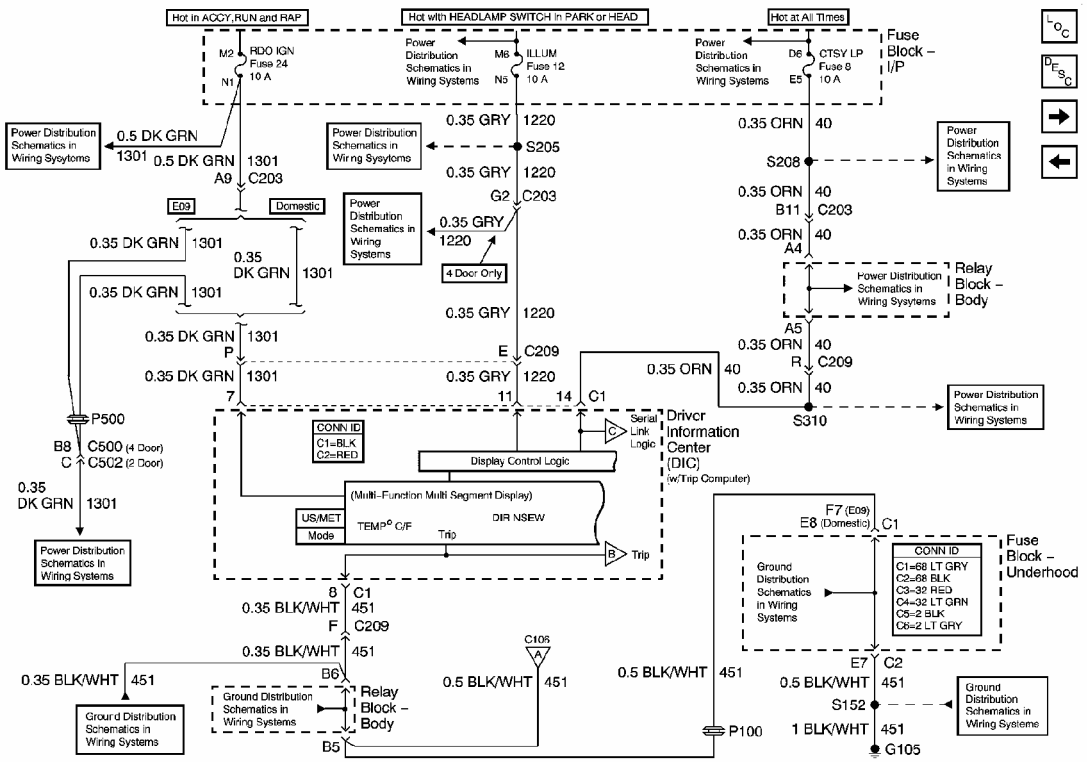


Fig. 6: Power and Ground - w/ Trip Computer
Courtesy of GENERAL MOTORS CORP.

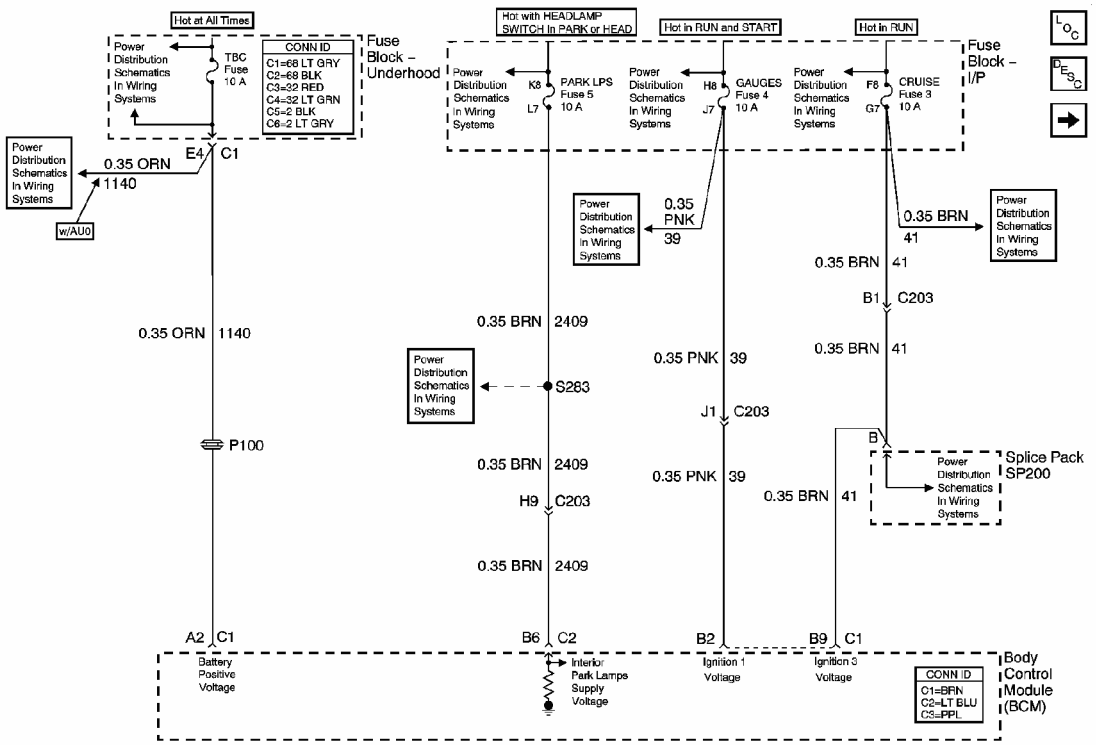


Fig. 7: TBC, PARK LPS, GAGES and CRUISE Fuses
Courtesy of GENERAL MOTORS CORP.

AUDIBLE WARNINGS SCHEMATICS

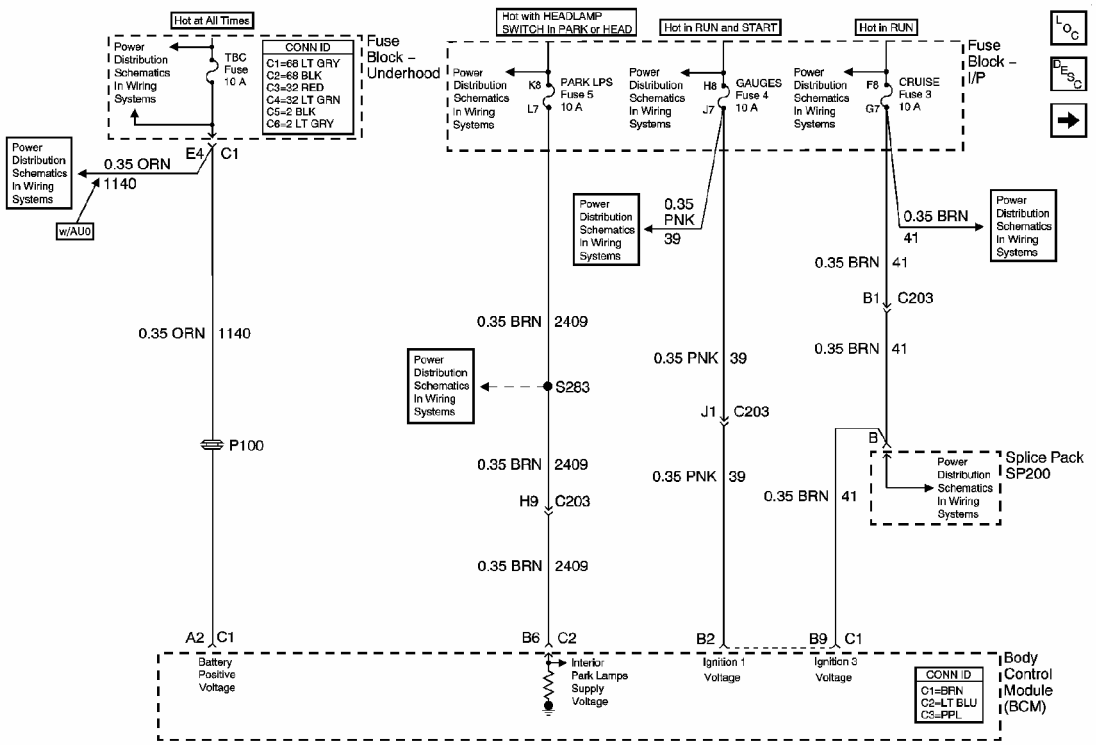


Fig. 8: TBC, PARK LPS, GAGES and CRUISE Fuses
Courtesy of GENERAL MOTORS CORP.

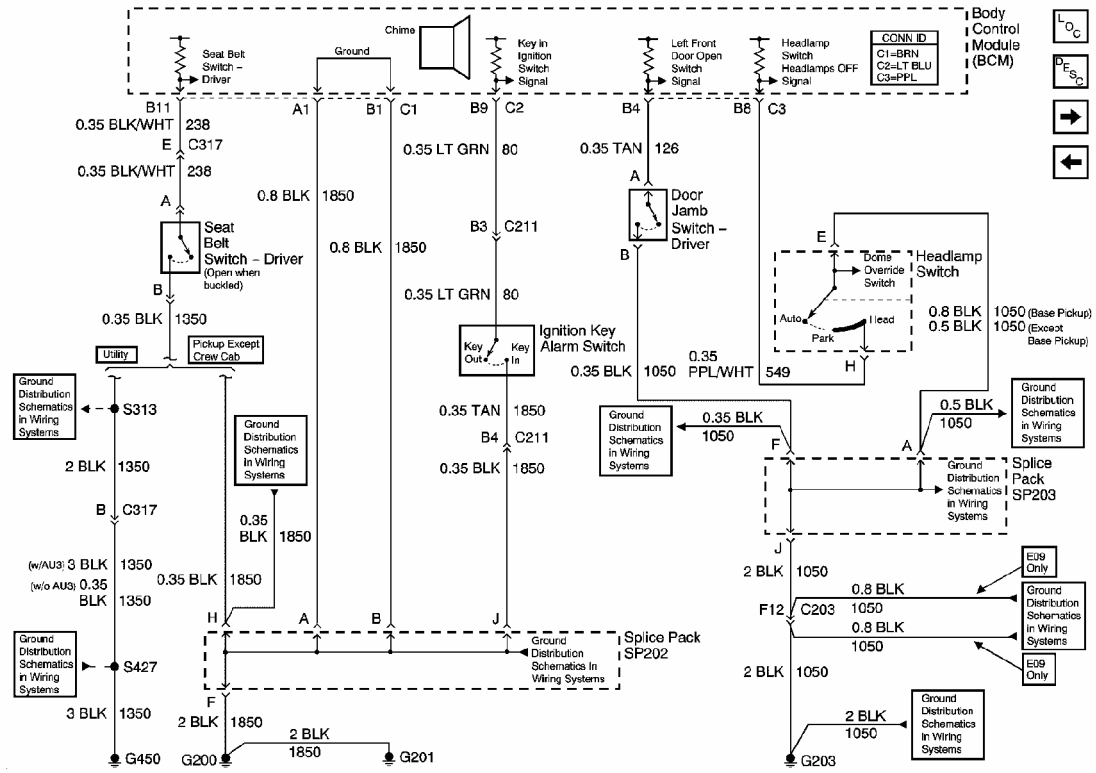


Fig. 9: Seat Belt Switch, Ignition Key Alarm Switch, Door Jamb Switch and Headlamp Switch

Courtesy of GENERAL MOTORS CORP.

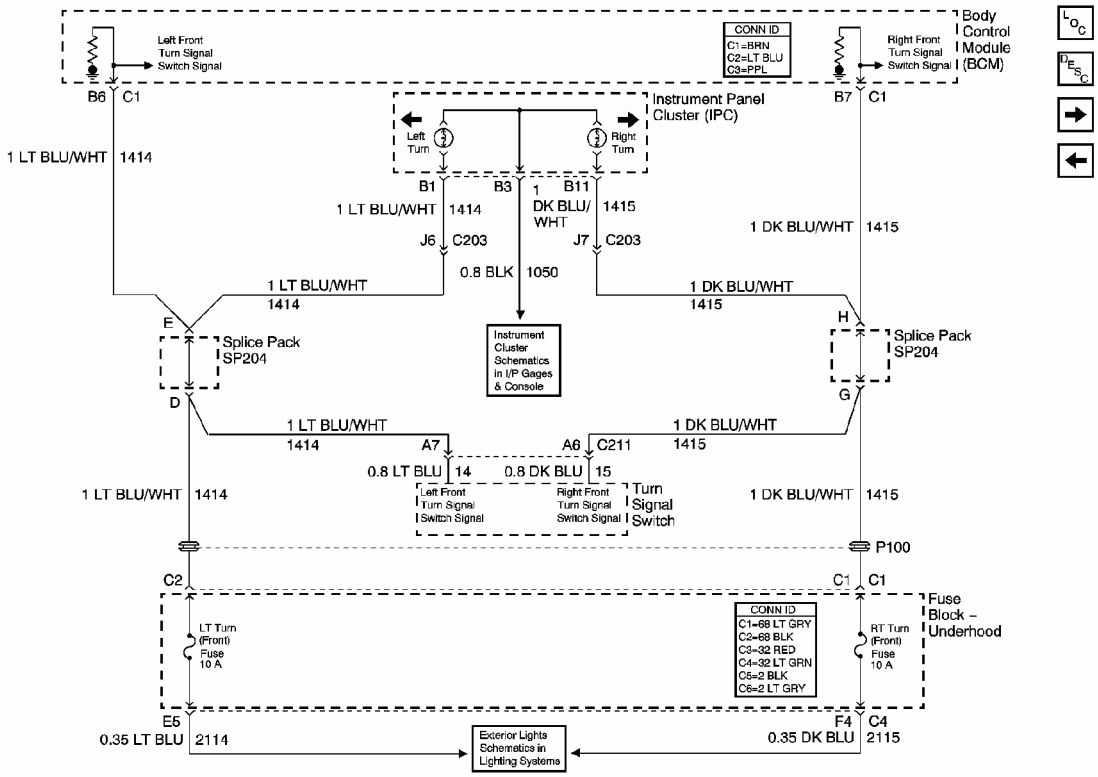


Fig. 10: Turn Signals

Courtesy of GENERAL MOTORS CORP.

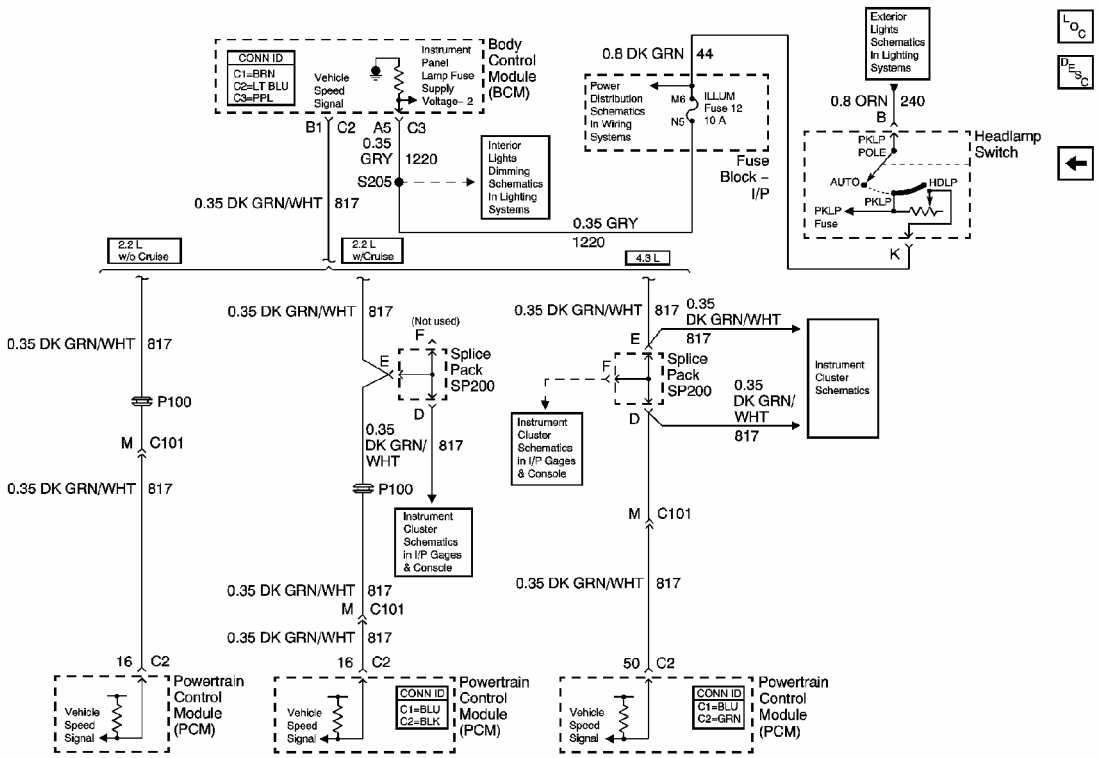


Fig. 11: BCM, PCM and Headlamp Switch
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

INSTRUMENT PANEL, GAGES, AND CONSOLE COMPONENT VIEWS

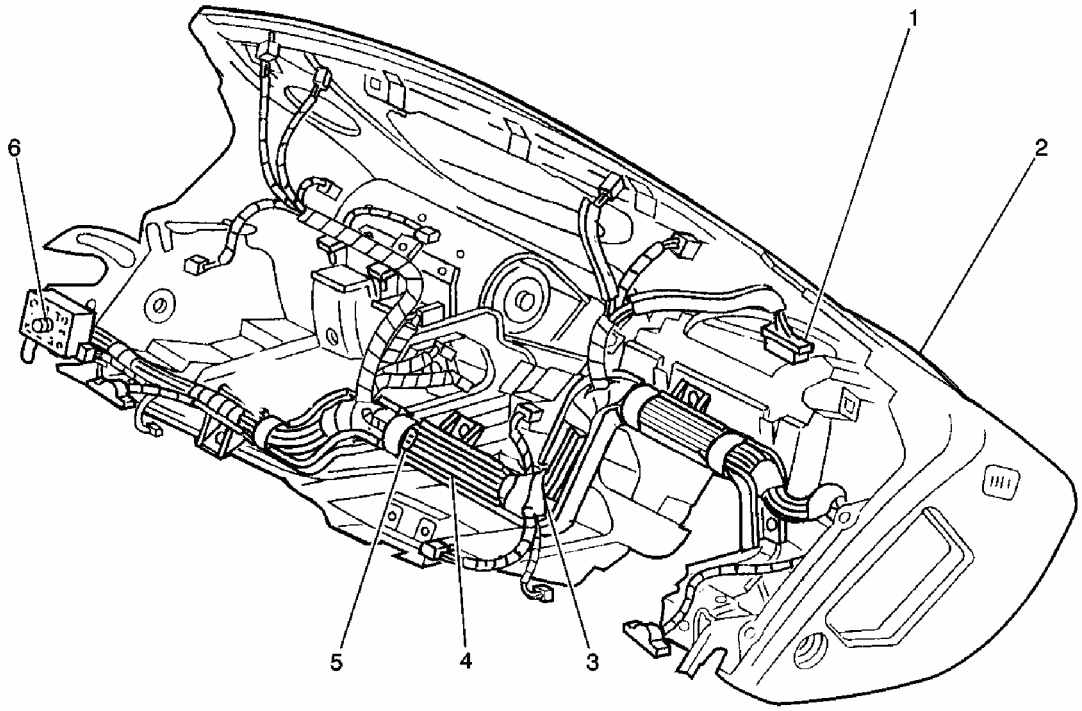


Fig. 12: IP Wiring Harness Composite View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 12

Callout	Component Name
1	Instrument Panel Cluster (IPC) Connector
2	Instrument Panel Cluster (IPC)
3	S240
4	S205
5	Splice Pack SP203
6	C203

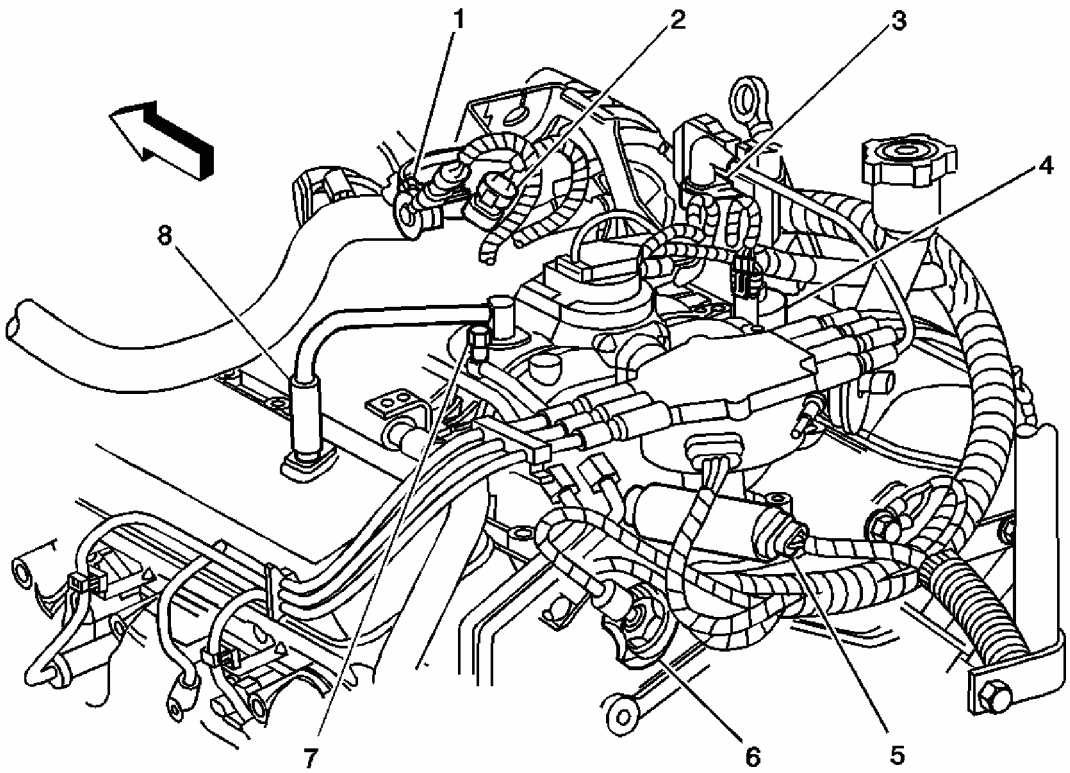


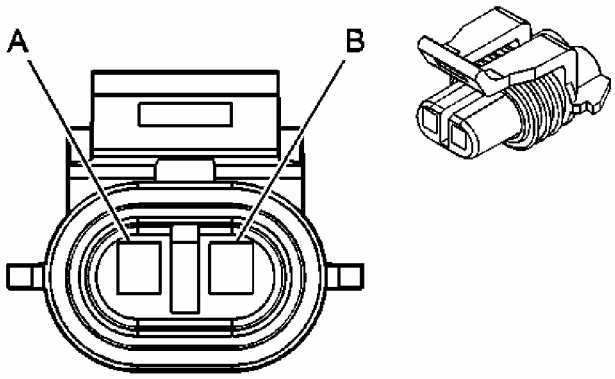
Fig. 13: Engine Harness Rear (4.3L)
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 13

Callout	Component Name
1	Throttle Position (TP) Sensor
2	Idle Air Control (IAC) Valve
3	Ignition Coil
4	Evaporative Emission (EVAP) Canister Purge Solenoid
5	Engine Oil Pressure (EOP) Sensor
6	Knock Sensor (KS)
7	Fuel Pressure Connection Valve
8	Positive Crankcase Ventilation (PCV) Valve

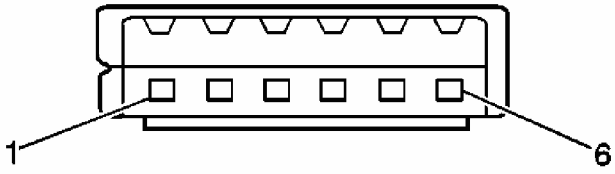
INSTRUMENT PANEL, GAGES, AND CONSOLE CONNECTOR END VIEWS

Ambient Air Temperature Sensor



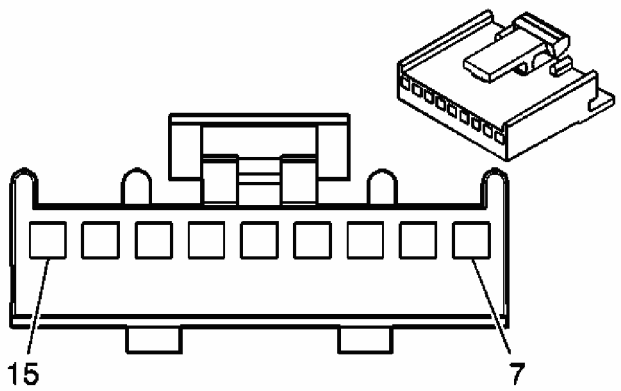
Connector Part Information		• 12052641 • 2-Way F Metri-Pack 150 Series Sealed (BLK)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	BLK/WHT	451	Ground
B	LT GRN/BLK	735	Ambient Air Temperature Sensor Signal

Compass Sensor



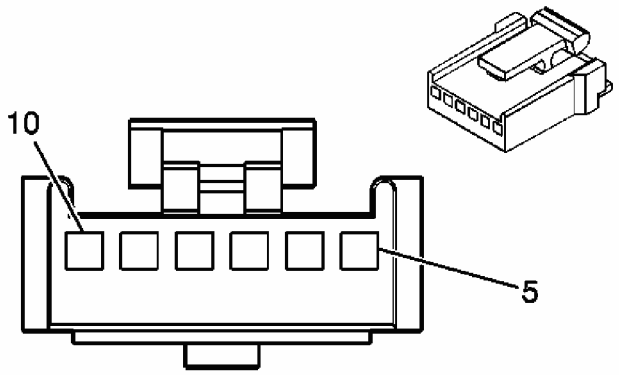
Connector Part Information		• XHP-6 • MOLEX 6-Way F (WHT)	
Pin	**Wire Color**	**Circuit No.**	**Function**
1	BLK	-	North/South (+)
2	WHT	-	North/South (-)
3	-	-	Not Used
4	CLR	-	Ground
5	RED	-	East/West (+)
6	GRN	-	East/West (-)

Driver Information Center (DIC) C1 (w/Trip Computer)



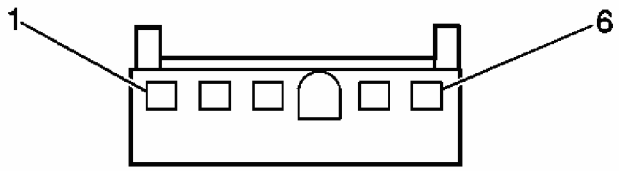
Connector Part Information		• 12064980 • 9-Way F Micro-Pack 100 Series (BLK)	
Pin	**Wire Color**	**Circuit No.**	**Function**
7	DK GRN	1301	RAP Fuse Supply Voltage
8	BLK/WHT	451	Ground
9	DK GRN/WHT	817	Vehicle Speed Signal
10	LT GRN/BLK	735	Ambient Air Temperature Sensor Signal
11	GRY	1220	Instrument Panel Lamp Fuse Supply Voltage - 2
12	PPL/WHT	1382	LED Dimming Signal
13	-	-	Not Used
14	ORN	40	Battery Positive Voltage
15	YEL	1127	Trip Computer/Nav Class 2 Serial Data

Driver Information Center (DIC) C1 (w/o Trip Computer)



Connector Part Information		• 12064993 • 6-Way F Micro-Pack 100 Series (BLK)	
Pin	**Wire Color**	**Circuit No.**	**Function**
5	DK GRN	1301	RDO IGN (RAP) Fuse Supply Voltage
6	BLK/WHT	451	Ground
7	DK GRN/WHT	817	VSS Signal
8	LT GRN/BLK	735	Ambient Air Temperature Sensor Signal
9	GRY	1220	Instrument Panel Lamp Fuse Supply Voltage - 2
10	PPL/WHT	1382	LED Dimming Signal

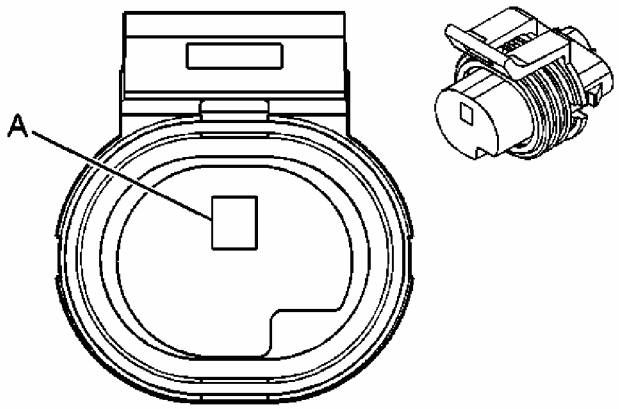
Driver Information Center (DIC) C2 (w/Short Console)



Connector Part Information		• 22-01-3067 • MOLEX 6-Way F (RED)	
Pin	**Wire Color**	**Circuit No.**	**Function**
1	GRN	-	East/West (-)
2	RED	-	East/West (+)
3	CLR	-	Ground

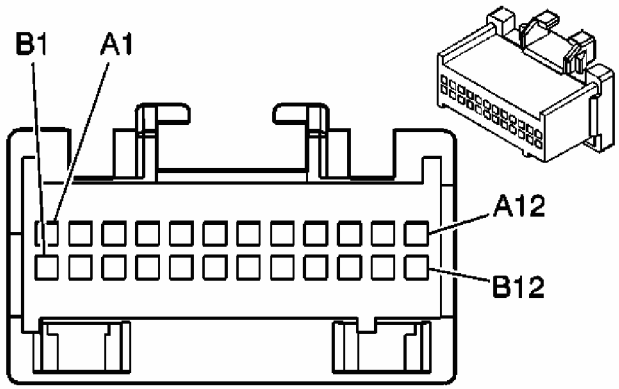
4	-	-	Not Used
5	WHT	-	North/South (-)
6	BLK	-	North/South (+)

Engine Oil Pressure (EOP) Sensor



Connector Part Information		• 12065299 • 1-Way F Metri-Pack 150 Series, Sealed (GRY)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	TAN/WHT	331	Oil Pressure Sensor Signal

Instrument Panel Cluster (IPC)



Connector Part Information		• 12110088 • 24-Way F Micro-Pack 100 Series (GRY)	
Pin	**Wire Color**	**Circuit No.**	**Function**

A1	-	-	Not Used
A2	TAN/WHT	331	Oil Pressure Sensor Signal
A3	WHT	121	Engine Speed Signal
A4	DK GRN	389	Vehicle Speed Signal
A5	BRN	41	Ignition 3 Voltage
A6	GRY	1036	IPC Class 2 Serial Data
A7	PNK	39	Ignition 1 Voltage
A8	PNK	1020	Off/Run/Crank Voltage
A9	BLK/WHT	451	Ground
A10	ORN	340	Battery Positive Voltage
A11	BRN/WHT	419	MIL Control
A12	ORN/BLK	1786	Transmission Park/Neutral Signal
B1	LT BLU/WHT	1414	Left Front Turn Signal Switch Signal
B2	GRY	1220	Instrument Panel Lamp Fuse Supply Voltage - 2
B3	BLK	1050	Ground
B4-B10	-	-	Not Used
B11	DK BLU/WHT	1415	Right Front Turn Signal Switch Signal
B12	-	-	Not Used

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - INSTRUMENT PANEL, GAGES AND CONSOLE

Begin the system diagnosis with **Diagnostic System Check - Instrument Cluster** , **Diagnostic System Check - Driver Information Systems** or **Diagnostic System Check - Audible Warnings** . The Diagnostic System Check will provide the following information:

- The identification of the control modules which command the system
- The ability of the control modules to communicate through the serial data circuit
- The identification of any stored diagnostic trouble codes (DTCs) and their status

The use of the Diagnostic System Check will identify the correct procedure for diagnosing the system and where the procedure is located.

DIAGNOSTIC SYSTEM CHECK - INSTRUMENT CLUSTER

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: Lack of communication may be due to a partial malfunction of the class 2 serial data circuit or due to a total malfunction of the class 2 serial data circuit. The specified procedure will determine the particular condition.

4: The Symptoms list in **Symptoms - Instrument Panel, Gages and Console** will determine the correct diagnostic procedure to use.

5: The presence of DTCs which begin with "U" indicate some other module is not communicating. The specified procedure will compile all the available information before tests are performed.

Diagnostic System Check - Instrument Cluster

Step	Action	Yes	No
1	Install a scan tool. Does the scan tool power up?	Go to **Step 2**	Go to **Scan Tool Does Not Power Up** in Data Link Communications
2	1. Turn the ignition ON, with the engine OFF. 2. Attempt to establish communication with the following control modules: • Automatic Transfer Case (ATC) • Body Control Module (BCM) • Electronic Brake Control Module (EBCM) • Instrument Panel Cluster (IPC) • Powertrain Control Module (PCM) • Sensing and Diagnostic Module (SDM) Does the scan tool communicate with the control modules listed above?	Go to **Step 3**	Go to **Scan Tool Does Not Communicate with Class 2 Device** in Data Link Communications
3	**IMPORTANT:** **The engine may start during the following step. Turn the engine OFF as soon as you have observed the Crank power mode.** 1. Access the Class 2 Power Mode in the Diagnostic Circuit Check on the scan tool. 2. Rotate the ignition switch through all		

	positions while observing the Ignition Switch Power Mode parameter. Does the Ignition Switch parameter reading match the ignition switch position for all switch positions?	Go to **Step 4**	Go to **Power Mode Mismatch** in Body Control System
4	Select the display DTCs function on the scan tool for the following control modules: • Automatic Transfer Case (ATC) • Body Control Module (BCM) • Electronic Brake Control Module (EBCM) • Instrument Panel Cluster (IPC) • Powertrain Control Module (PCM) • Sensing and Diagnostic Module (SDM) Does the scan tool display any DTCs for the control modules listed above?	Go to **Step 5**	Go to **Symptoms - Instrument Panel, Gages and Console**
5	Does the scan tool display any DTCs which begin with a "U"?	Go to **Scan Tool Does Not Communicate with Class 2 Device** in Data Link Communications	Go to **Step 6**
6	Does the scan tool display DTC B1000?	Go to **Diagnostic Trouble Code (DTC) List** in Body Control System	Go to **Step 7**
7	Does the scan tool display DTC P0562, P0563, P0621, or P0622?	Go to **Diagnostic Trouble Code (DTC) List** in Engine Electrical	Go to **Diagnostic Trouble Code (DTC) List**

DIAGNOSTIC SYSTEM CHECK - DRIVER INFORMATION SYSTEMS

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: Lack of communication may be due to a partial malfunction of the class 2 serial data circuit or due to a total malfunction of the class 2 serial data circuit. The specified procedure will determine the particular condition.

3: The symptom list in Symptoms will determine the correct diagnostic procedure to use.

4: The presence of DTCs which begin with "U" indicate some other module is not communicating. The specified procedure will compile all the available information before tests are performed.

Diagnostic System Check - Driver Information Systems

Step	Action	Yes	No
Schematic Reference: Driver Information System Schematics			
1	Install a scan tool. Does the scan tool power up?	Go to **Step 2**	Go to **Scan Tool Does Not Power Up** in Data Link Communications
2	1. Turn the ignition ON, with the engine OFF. 2. Attempt to establish communication with the following control modules: • Body Control Module (BCM) • Instrument Panel Cluster (IPC) • Powertrain Control Module (PCM) Does the scan tool communicate with the control modules listed above?	Go to **Step 3**	Go to **Scan Tool Does Not Communicate with Class 2 Device** in Data Link Communications
3	Select the display DTCs function on the scan tool for the following control modules: • Body Control Module (BCM) • Instrument Panel Cluster (IPC) • Powertrain Control Module (PCM) Does the scan tool display any DTCs for the control modules listed above?	Go to **Step 4**	Go to **Symptoms - Instrument Panel, Gages and Console**
	Does the scan tool display any DTCs which begin with a "U"?	Go to **Scan Tool Does Not**	

4		**Communicate with Class 2 Device** in Data Link Communications	Go to **Step 5**
5	Does the scan tool display DTC B1000?	Go to **Diagnostic Trouble Code (DTC) List** in Body Control System	Go to **Step 6**
6	Does the scan tool display DTC P0562, P0563, P0621, P0622?	Go to **Diagnostic Trouble Code (DTC) List** in Engine Electrical	Go to **Diagnostic Trouble Code (DTC) List**

DIAGNOSTIC SYSTEM CHECK - AUDIBLE WARNINGS

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: Lack of communication may be due to a partial malfunction of the class 2 serial data circuit or due to a total malfunction of the class 2 serial data circuit. The specified procedure will determine the particular condition.

3: The Symptom list in **Symptoms - Instrument Panel, Gages and Console** will determine the correct diagnostic to use.

4: The presence of DTCs which begin with "U" indicate some other module is not communicating. The specified procedure will compile all the available information before tests are performed.

Diagnostic System Check - Audible Warnings

Step	Action	Yes	No
1	Install a scan tool. Does the scan tool power up?	Go to **Step 2**	Go to **Scan Tool Does Not Power Up** in Data Link Communications
2	1. Turn the ignition ON, with the engine OFF. 2. Attempt to establish communication with the following control modules: • Body Control Module (BCM)		Go to **Scan Tool Does Not**

	• Instrument Panel Cluster (IPC) Does the scan tool communicate with the control modules listed above?	Go to **Step 3**	**Communicate with Class 2 Device** in Data Link Communications
3	Select the display DTCs function on the scan tool for the following control modules: • Body Control Module (BCM) • Instrument Panel Cluster (IPC) Does the scan tool display any DTCs?	Go to **Step 4**	Go to **Symptoms - Instrument Panel, Gages and Console**
4	Does the scan tool display any DTCs which begin with a "U"?	Go to **Scan Tool Does Not Communicate with Class 2 Device** in Data Link Communications	Go to **Step 5**
5	Does the scan tool display B1000?	Go to **Diagnostic Trouble Code (DTC) List** in Body Control System	Go to **Diagnostic Trouble Code (DTC) List**

SCAN TOOL OUTPUT CONTROLS

Scan Tool Output Controls

Scan Tool Output Control	Additional Menu Selection(s)	Description
Coolant Gage Sweep Test	IPC Gages	The IPC drives the coolant gage at or above 125° C (260°F) when you select Up. The IPC drives the coolant gage at or below 60°C (140°F) when you select Down.
Fuel Gage Sweep Test	IPC Gages	The IPC drives the fuel gage at or above full when you select Up. The IPC drives the fuel gage at or below empty when you select Down.
Speed Gage Sweep Test	IPC Gages	The IPC drives the speedometer at or above 160 km/h (100 mph) (base) or 190 km/h (120 mph) (uplevel) when you select Up. The IPC drives the speedometer at or below 0 km/h (0 mph)

		when you select Down.
Tach Gage Sweep Test	IPC Gages	The IPC drives the tachometer at or above 6000 RPM when you select Up. The IPC drives the tachometer at or below 0 RPM when you select Down.
Lamp Test	-	The IPC illuminates the following indicators when you select On: • ABS • Air Bag • Battery • BRAKE • Fasten Safety Belt • GATE AJAR • High Beam • LOW FUEL • OVERSPEED • SECURITY • SERVICE 4WD • SHIFT • TOW/HAUL The indicators should illuminate until commanded Off.
1st	PRNDL Display	The IPC illuminates the 1st gear position (1) on the IPC when you select On. The 1st gear position should illuminate until commanded Off.
2nd	PRNDL Display	The IPC illuminates the 2nd gear position (2) on the IPC when you select On. The 2nd gear position should illuminate until commanded Off.
3rd	PRNDL Display	The IPC illuminates the 3rd gear position (3) on the IPC when you select On. The 3rd gear position should illuminate until commanded Off.
Drive	PRNDL Display	The IPC illuminates the drive position (D) on the IPC when you select On. The drive position should illuminate until commanded Off.
Neutral	PRNDL Display	The IPC illuminates the neutral position (N) on the IPC when you select On. The neutral position should illuminate until commanded Off.

Park	PRNDL Display	The IPC illuminates the park position (P) on the IPC when you select On. The park position should illuminate until commanded Off.
Reverse	PRNDL Display	The IPC illuminates the reverse position (R) on the IPC when you select On. The reverse position should illuminate until commanded Off.

SCAN TOOL DATA LIST

The scan tool data lists contain all the instrument panel, gages, and console related parameters that are available on the scan tool. The parameters in the list are arranged in alphabetical order. The data list column indicates the location of the parameter within the scan tool menu selections.

Use the scan tool data lists as directed by a diagnostic table or in order to supplement the diagnostic procedures. Begin all of the diagnostic procedures with **Diagnostic System Check - Instrument Cluster** , **Diagnostic System Check - Driver Information Systems** , or **Diagnostic System Check - Audible Warnings** .

Use the scan tool data lists only after the following is determined:

- There is no published DTC procedure nor published symptom procedure for the customer concern.
- The DTC or symptom procedure indicated by the diagnostic system check does not resolve the customer concern.

The typical data values are obtained from a properly operating vehicle under the conditions specified in the first row of the scan tool data list table. Comparison of the parameter values from the suspect vehicle with the typical data values may reveal the source of the customer concern.

Body Control Module (BCM)

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF/High Beams Off/Doors Closed/Trunk Closed/Park Brake Unapplied			
Battery Voltage	Data	Volts	12.5 V (varies)
Driver Door Jamb Sw	Input 1	Active/Inactive	Inactive
Ignition 1	Input 1	Active/Inactive	Active
Ignition 3	Input 1	Active/Inactive	Active
Key in Ignition	Input 1	Yes/No	Yes
Left Turn Signal	Input 2	On/Off	Off
Park Brake Switch	Input 1	Set/Released	Released

Park Lamps	Input 2	On/Off	Off
Right Turn Signal	Input 2	On/Off	Off
Security Lamp State	Security Data	On/Off/Flashing	Off
Vehicle Speed	Data	km/h (mph)	0 km/h (0 mph)

Instrument Panel Cluster (IPC)

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF/Seat Belt Buckled/High Beams Off/Park Brake Unapplied			
4WD	Outputs	On/Off	Off
ABS Lamp	Outputs	On/Off	Off
Battery	Outputs	On/Off	On
Battery Voltage	Data	Voltage	Varies
Brake Lamp	Outputs	On/Off	Off
Cargo Lamp On	Outputs	On/Off	Off
Change Engine Oil	Outputs	On/Off	Off
Check Coolant Temp	Outputs	On/Off	Off
Check Engine Oil Level	Outputs	On/Off	Off
Check Engine Temp	Outputs	On/Off	Off
Cruise Control	Outputs	On/Off	Off
Dimming	Inputs	Active/Inactive	Inactive
Displayed Coolant Temp	Data	Celsius (Fahrenheit)	87°C (190°F)
Displayed Fuel Level	Data	Percent	0-100% (Varies)
Displayed Odometer	Data	Kilometers (Miles)	Varies with the mileage of vehicle
Displayed Trip Odometer	Data	Kilometers (Miles)	Varies with the mileage of vehicle
Engine Speed	Data	RPM	0 RPM
Fasten Seat Belts	Outputs	On/Off	Off
High Beam Lamp	Outputs	On/Off	Off
Low Coolant	Outputs	On/Off	Off
Low Fuel Lamp	Outputs	On/Off	Off
Low Washer Fluid	Outputs	On/Off	Off
Module Part Number	Module Information	Numeric	Varies
		Celsius	82-93°C (180-

Monitored Coolant Temp	Data	(Fahrenheit)	200°F)
Monitored Fuel Level	Data	Percent	0-100% (Varies)
Oil Pressure Lamp	Outputs	On/Off	Off
Overspeed Lamp	Outputs	On/Off	Off
Park Switch	Inputs	Open/Closed	Closed
PRNDL State	Inputs	Park/ Reverse/ Neutral/ First/ Second/ Third/ Drive	Park
Reduced Engine Power	Outputs	Active/Inactive	Inactive
Security Lamp	Outputs	On/Off	Off
Service 4WD	Outputs	On/Off	Off
Tow/Haul	Outputs	On/Off	Off
Trans. Fluid Hot	Outputs	On/Off	Off
Trans. Hot...Idle Engine	Outputs	On/Off	Off
Trip Reset Switch	Inputs	Active/Inactive	Inactive
Upshift Lamp	Outputs	On/Off	Off
Vehicle Speed	Data	km/h (mph)	0 km/h (0 mph)

Powertrain Control Module (PCM)

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Engine Idling/Normal Operating Temperature			
Cruise Control Active	Engine Data 1 Engine Data 2 Engine Data 3	Yes/No	No
ECT Sensor	Engine Data 1 Engine Data 2 Engine Data 3 EGR Data Enhanced EVAP Data Fuel Trim Data H02S Data Misfire Data	Celsius (Fahrenheit)	85-105°C (185-220°F)
Engine Oil Life Remaining	Engine Data 3	Percent	0-100%
Engine Oil Pressure Sensor	Engine Data 2	Volts	0-5 Volts (Varies)
	Engine Data 1 Engine Data 2 Engine Data 3		

Engine Speed	Enhanced EVAP Data Fuel Trim Data H02S Data Misfire Data	RPM	+/-100 RPM from desired idle speed
Fuel Level Sensor	Engine Data 1 EGR Data Enhanced EVAP Data	Volts	0-5 Volts (Varies)
Fuel Tank Level Remaining	Enhanced EVAP Data	Percent	0-100% (varies)
Fuel Tank Level Remaining	Enhanced EVAP Data	liters (gallons)	0-70 liters (varies)
Ignition 1 Signal	Engine Data 1 Engine Data 2 Engine Data 3 Enhanced EVAP Data Fuel Trim Data	Volts	9-16 V (varies)
MIL (Malfunction Indicator Lamp) Command	Engine Data 1	On/Off	Off
Vehicle Speed Sensor	Engine Data 1 Engine Data 2 Engine Data 3 Enhanced EVAP Data Fuel Trim Data H02S Data	km/h (mph)	0 km/h (0 mph)

SCAN TOOL DATA DEFINITIONS

4WD

The scan tool displays On or Off. This is the state of the 4WD indicator as commanded by the instrument panel cluster (IPC).

ABS Lamp

The scan tool displays On or Off. The state of the ABS indicator as commanded by the IPC.

Battery

The scan tool displays On or Off. The state of the battery indicator as commanded by

the IPC.

Battery Voltage

The scan tool displays 0-19 volts. The voltage measured at the battery positive voltage circuit of the BCM.

Battery Voltage

The scan tool displays 0-19 volts. The voltage measured at the battery positive voltage circuit of the IPC.

Brake Lamp

The scan tool displays On or Off. The state of the BRAKE indicator as commanded by the IPC.

Cargo Lamp On

The scan tool displays On or Off. This is the state of the cargo lamp as commanded by the IPC.

Change Engine Oil

The scan tool displays On or Off. This is the state of the change engine oil indicator as commanded by the IPC.

Check Coolant Temp

The scan tool displays On or Off. This is the state of the check coolant temperature indicator as commanded by the IPC.

Check Engine Oil Level

The scan tool displays On or Off. This is the state of the check engine oil level indicator as commanded by the IPC.

Check Engine Temp

The scan tool displays On or Off. This is the state of the check engine temperature indicator as commanded by the IPC.

Cruise Control

The scan tool displays On or Off. The state of the cruise control indicator as commanded by the IPC.

Cruise Control Active

The scan tool displays Yes or No. This is the state of the cruise control as commanded by the PCM.

Dimming

The scan tool displays Active or Inactive. Active is displayed when the park lamps are ON. Inactive is displayed when the park lamps are OFF.

Displayed Coolant Temp

The scan tool displays the coolant temperature displayed by the IPC in °C (°F). This value may slightly differ from the monitored coolant temperature.

Displayed Fuel Level

The scan tool displays the fuel level percentage displayed by the IPC. This value may slightly differ from the monitored fuel level.

Displayed Odometer

The scan tool displays the odometer data displayed by the IPC in kilometers (miles).

Displayed Trip Odometer

The scan tool displays the trip odometer data displayed by the IPC in kilometers (miles).

Driver Door Jamb Sw

The scan tool displays Active or Inactive. The output of the driver door jamb switch. An open switch with the door open is displayed as Active.

ECT Sensor

The scan tool displays -40 to +151°C (-40 to +304°F). The PCM monitors the voltage at the signal circuit of the engine coolant temperature sensor. The voltage is inversely proportional to the engine coolant temperature.

Engine Oil Life Remaining

The scan tool displays 0-100 percent. The PCM calculates the remaining engine oil life.

Engine Oil Pressure Sensor

The scan tool displays 0 to 5 volts. The PCM monitors the engine oil pressure sensor signal circuit where a low voltage indicates low pressure.

Engine Speed

The scan tool displays 0-9999 RPM. The IPC monitors the engine speed signal circuit from the PCM.

Engine Speed

The scan tool displays 0-9999 RPM. Engine speed is computed by the PCM from the 3X reference input. It should remain close to desired idle under various engine loads with the engine idling.

Fasten Seat Belts

The scan tool displays On or Off. The state of the fasten safety belt indicator as commanded by the IPC.

Fuel Level Sensor

The scan tool displays 0-5 volts. The PCM monitors the fuel level sensor signal circuit where 0 V is an empty tank.

Fuel Tank Level Remaining

The scan tool displays 0-100%. The PCM calculates the amount of fuel remaining in the tank based on the input from the fuel level sensor.

Fuel Tank Level Remaining

The scan tool displays liters. The PCM calculates the amount of fuel remaining in the tank based on the input from the fuel level sensor.

High Beam Lamp

The scan tool displays On or Off. The state of the high beam indicator as commanded by the IPC.

Ignition 1

The scan tool displays Active or Inactive. The BCM displays Active if it senses voltage at the ignition 1 input.

Ignition 1 Signal

The scan tool displays 0-16 volts. The ignition 1 signal represents the system voltage detected by the PCM at the ignition voltage circuit.

Ignition 3

The scan tool displays Active or Inactive. The BCM displays Active if it senses voltage at the ignition 3 input.

Key in Ignition

The scan tool displays Yes or No. The BCM monitors the key in ignition signal circuit. A closed switch with the key in the ignition is displayed as Yes.

Left Turn Signal

The scan tool displays On or Off. The BCM monitors the signal circuit of the left turn signal switch. A closed switch is displayed as On.

Low Coolant

The scan tool displays On or Off. This is the state of the low coolant indicator as commanded by the IPC.

Low Fuel Lamp

The scan tool displays On or Off. The state of the low fuel indicator as commanded by the IPC.

Low Washer Fluid

The scan tool displays On or Off. The IPC monitors the windshield washer solvent level switch, where a closed switch with low washer fluid is displayed as On.

MIL (Malfunction Indicator Lamp) Command

The scan tool displays On or Off. This is the commanded state of the MIL (Malfunction Indicator Lamp) by the PCM.

Module Part Number

The scan tool displays the GM part number of the IPC.

Monitored Coolant Temp

The scan tool displays the coolant temperature data in °C (°F) as provided to the IPC from the PCM via the class 2 serial data link.

Monitored Fuel Level

The scan tool displays the fuel level percentage as provided to the IPC from the PCM via the class 2 serial data link.

Oil Pressure Lamp

The scan tool displays On or Off. The state of the oil pressure indicator as commanded by the IPC. The IPC monitors the engine oil pressure sensor signal where a low sensor resistance is proportional to low oil pressure.

Overspeed Lamp

The scan tool displays On or Off. The state of the overspeed indicator as commanded by the IPC.

Park Brake Switch

The scan tool displays Set or Released. The BCM monitors the park brake switch signal circuit.

Park Lamps

The scan tool displays On or Off. The BCM monitors the signal circuit of the park lamp switch. A closed switch is displayed as On.

Park Switch

The scan tool displays Open or Closed. The state of the park position switch. A closed switch with the shifter in Park is displayed as Closed.

PRNDL State

The scan tool displays the PRNDL range of the vehicle as communicated to the IPC by the PCM via the class 2 serial data link.

Reduced Engine Power

The scan tool displays Inactive or Active. This is the state of the Reduced Engine Power indicator as commanded by the IPC.

Right Turn Signal

The scan tool displays On or Off. The BCM monitors the signal circuit of the right turn signal switch. A closed switch is displayed as On.

Security Lamp

The scan tool displays On or Off. The state of the security indicator as commanded by the IPC.

Security Lamp State

The scan tool displays On, Off or Flashing. The state of the security indicator as commanded by the BCM.

Service 4WD

The scan tool displays On or Off. The state of the Service 4WD indicator as commanded by the IPC.

Tow/Haul

The scan tool displays On or Off. The IPC monitors the signal circuit of the tow/haul switch. A closed switch is displayed as On.

Trans. Fluid Hot

The scan tool displays On or Off. This is the state of trans fluid hot indicator as commanded by the IPC.

Trans. Hot...Idle Engine

The scan tool displays On or Off. This is the state of trans hot indicator as commanded by the IPC.

Trip Reset Switch

The scan tool displays Active or Inactive. The IPC monitors the trip reset switch. A closed switch is displayed as Active.

Upshift Lamp

The scan tool displays On or Off. The state of the Upshift indicator as commanded by the IPC.

Vehicle Speed

The scan tool displays 0-255 km/h (0-155 mph). The BCM monitors the vehicle speed signal circuit from the PCM.

Vehicle Speed

The scan tool displays 0-255 km/h (0-155 mph). The IPC monitors the vehicle speed signal circuit from the PCM.

Vehicle Speed Sensor

The scan tool displays 0-255 km/h (0-155 mph). The PCM monitors the voltage at the signal circuit of the vehicle speed sensor. The voltage is proportional to the vehicle speed.

DIAGNOSTIC TROUBLE CODE (DTC) LIST

Diagnostic Trouble Code (DTC) List

DTC	Diagnostic Procedure	Module(s)
BXXXX	Refer to **Diagnostic Trouble Code (DTC) List** in SIR	SDM
B1367	**DTC B1367**	IPC
B2961	**DTC B2961**	BCM
CXXXX	Refer to **Diagnostic Trouble Code (DTC) List** in Anti-lock Brake System	EBCM
P0461	**DTC P0461**	PCM
P0462	**DTC P0462**	PCM
P0463	**DTC P0463**	PCM
P0608	**DTC P0608**	PCM
P0654	**DTC P0654**	PCM
P0706	**DTC P0706** in Automatic Transmission - 4L60-E	PCM
PXXXX	Refer to **Diagnostic Trouble Code (DTC) List** in Engine Controls - 4.3L for additional DTCs	PCM

DTC B1367

Circuit Description

When the ignition switch is in the UNLOCK position, certain class 2 messages do not transmit. The instrument panel cluster (IPC) suspends the operation of the indicators and the gages that are dependent on these messages until the ignition switch is no longer in the UNLOCK position.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

The ignition 0 voltage circuit is less than 75 percent of battery voltage for more than 1 second.

Action Taken When the DTC Sets

- The odometer and the PRNDL displays do not illuminate.
- The fuel gage and the engine coolant temperature gage default to their minimum physical position.
- The scan tool does not communicate with the instrument cluster.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 40 malfunction free warm-up cycles.
- The IPC receives the clear code command from the scan tool.

Diagnostic Aids

- When the instrument cluster detects low voltage at the ignition 0 voltage circuit, the instrument cluster will not communicate with the scan tool. The odometer and the PRNDL displays will not illuminate. The season odometer will display if the trip reset switch is pressed, and the instrument cluster will communicate with the scan tool until the trip reset switch is released.
- DTC B1367 can only be read by the scan tool as a history code once the fault is removed.
- An intermittent condition is likely to be caused by an open condition in the ignition 0 voltage circuit.
- Refer to **Scan Tool Does Not Communicate with Class 2 Device** in Data Link Communications for diagnosis of a loss of communication with the instrument cluster.

DTC B2961

Circuit Description

The body control module (BCM) monitors the ignition key alarm switch. When the key is in the ignition, the ignition key alarm switch is closed and the signal circuit is low. When the key is not in the ignition, the ignition key alarm switch is open and the signal circuit is high.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

- The ignition 1 input is active, and the key in ignition switch signal circuit is high.
- The conditions above must be present for more than 5 seconds.

Action Taken When the DTC Sets

The BCM stores DTC B2961 in memory.

Conditions for Clearing the DTC

- The DTC becomes history when the fault is no longer present.
- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.
- The BCM receives the clear code command from the scan tool.

DTC B2961

Step	Action	Yes	No
Schematic Reference: Audible Warnings Schematics Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views or Body Control System Connector End Views			
1	Did you perform the Audible Warnings Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Audible Warnings**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With the scan tool, observe the Key in Ignition parameter in the BCM Input 1 data list. Does the Key in Ignition parameter display Yes?	Go to **Step 3**	Go to **Step 4**
3	1. Turn the ignition ON, with the engine OFF. 2. Observe the Ignition 1 parameter in the BCM Input 1 data list. 3. Turn the ignition OFF. Does the Ignition 1 parameter display ACTIVE with the ignition OFF?	Go to **Step 7**	Go to **Step 11**
	1. Turn the ignition OFF.		

4	2. Disconnect the BCM connector C2. 3. Connect a test lamp between the key in ignition signal circuit and battery positive voltage. 4. Place the key in the ignition. Does the test lamp illuminate?	Go to **Step 8**	Go to **Step 5**
5	Test the key in ignition signal circuit for an open or for a high resistance. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 12**	Go to **Step 6**
6	Test the ground circuit of the ignition key alarm switch for an open or for a high resistance. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 12**	Go to **Step 9**
7	Test the ignition 1 voltage circuit for a short to voltage. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 12**	Go to **Step 11**
8	Inspect for poor connections at the harness connector of the BCM. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 12**	Go to **Step 11**
9	Inspect for poor connections at the harness connector of the ignition switch. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 12**	Go to **Step 10**
10	Replace the ignition switch. Refer to **Ignition Switch Replacement** in Steering Wheel and Column. Did you complete the replacement?	Go to **Step 12**	-
11	**IMPORTANT:** **Perform the set up procedure for the replacement BCM.** Replace the BCM. Refer to **Body Control**		

	Module Replacement in Body Control System.Did you complete the replacement?	Go to **Step 12**	
12	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	Go to **Step 2**	System OK

DTC P0461

Circuit Description

The fuel level sender changes resistance based on fuel level. The PCM monitors the signal circuit of the fuel level sender in order to determine fuel level. When the fuel tank is full, the sender resistance is high and the PCM senses a high signal voltage. When the fuel tank is empty, the sender resistance is low and the PCM senses a low signal voltage. The PCM uses the signal circuit of the fuel level sender in order to calculate the total remaining fuel percent in the tank. The PCM sends the fuel level percent via the class 2 serial data circuit to the instrument cluster in order to control the fuel gage. The fuel level information is also used for misfire and EVAP diagnostics.

This diagnostic tests for a stuck fuel level sender signal. The PCM sets this DTC if the fuel level sender signal appears to be stuck based on a lack of signal variation expected during normal operation.

Conditions for Running the DTC

- The ignition is ON.
- The PCM has confirmed that the fuel tank is between 15 percent and 85 percent full.

Conditions for Setting the DTC

The PCM does not detect a change in fuel level of at least 3.0 L (0.79 gal) over a distance of 320 km (200 mi).

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The LOW FUEL indicator illuminates.
- The PCM records the operating conditions at the time the diagnostic fails. The PCM stores the failure information in the Failure Records on the scan tool.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 40 malfunction free warm-up cycles.
- The PCM receives the clear code command from the scan tool.

Diagnostic Aids

- Use the Freeze Frame and/or Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame and/or Failure Records data may aid in determining the number of miles since the DTC set. The Fail Counter and Pass Counter can also aid in determining the number of ignition cycles that the diagnostic reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions such as RPM, engine load, vehicle speed, temperature, etc. This will isolate when the DTC failed.
- Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

DTC P0461

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Remove the fuel level sender. 2. Inspect for the following items: • A stuck fuel level sender such as the fuel strainer interfering with the sender float arm • Foreign material in the fuel tank such as ice Did you find and correct the condition?	Go to **Step 4**	Go to **Step 3**
3	Replace the fuel level sender. Refer to **Fuel Level Sensor Replacement** in Engine Controls. Did you complete the replacement?	Go to **Step 4**	-
4	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the		

	Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	Go to **Step 2**	System OK

DTC P0462

Circuit Description

The fuel level sender changes resistance based on fuel level. The powertrain control module (PCM) monitors the signal circuit of the fuel level sender in order to determine fuel level. When the fuel tank is full, the sender resistance is high and the PCM senses a high signal voltage. When the fuel tank is empty, the sender resistance is low and the PCM senses a low signal voltage. The PCM uses the signal circuit of the fuel level sender in order to calculate the total remaining fuel percentage in the tank. The PCM sends the fuel level percent via the class 2 serial data circuit to the instrument cluster in order to control the fuel gage. The fuel level information is also used for misfire and evaporative emission (EVAP) diagnostics.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

- The fuel level signal is less than 1 percent.
- The above condition is present for greater than 20 seconds.

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The LOW FUEL indicator illuminates.
- The PCM records the operating conditions at the time the diagnostic fails. The PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 40 malfunction free warm-up cycles.
- The PCM receives the clear code command from the scan tool.

Diagnostic Aids

- Use the Freeze Frame and/or Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame and/or Failure Records data may aid in determining the number of miles since

the DTC set. The Fail Counter and Pass Counter can also aid in determining the number of ignition cycles that the diagnostic reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions such as RPM, engine load, vehicle speed, temperature, etc. This will isolate when the DTC failed.

- Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Test Description

The number below refers to the step number on the diagnostic table.

3: Tests for the proper operation of the circuit in the high voltage range.

DTC P0462

Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics Connector End View Reference: Master Electrical Component List				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With a scan tool, observe the Fuel Tank Level Remaining parameter in the PCM Enhanced EVAP Data data list. Does the scan tool indicate that the Fuel Tank Level Remaining parameter is less than the specified value?	1%	Go to **Step 3**	Go to Diagnostic Aids
3	1. Turn the ignition OFF. 2. Disconnect C104. 3. Turn the ignition ON, with the engine OFF. 4. With a scan tool, observe the Fuel Tank Level Remaining parameter. Does the scan tool indicate that the	99%		

	Fuel Tank Level Remaining parameter is greater than the specified value?		Go to **Step 5**	Go to **Step 4**
4	Test the signal circuit of the fuel level sender for a short to ground. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 7**
5	Test the signal circuit of the fuel level sender for a short to ground between C104 and the fuel level sender. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 6**
6	Inspect for poor connections at the harness connector of the fuel level sender. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 8**
7	Inspect for poor connections at the harness connector of the powertrain control module (PCM). Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 9**
8	Replace the fuel level sender. Refer to **Fuel Level Sensor Replacement** in Engine Controls - 4.3L. Did you complete the replacement?	-	Go to **Step 10**	-
9	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.3L.Did you complete the replacement?	-	Go to **Step 10**	-
	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the			

10	Conditions for Running the DTC. Does the DTC reset?	-	Go to **Step 2**	System OK

DTC P0463

Circuit Description

The fuel level sender changes resistance based on fuel level. The powertrain control module (PCM) monitors the signal circuit of the fuel level sender in order to determine fuel level. When the fuel tank is full, the sender resistance is high and the PCM senses a high signal voltage. When the fuel tank is empty, the sender resistance is low and the PCM senses a low signal voltage. The PCM uses the signal circuit of the fuel level sender in order to calculate the total remaining fuel percentage in the tank. The PCM sends the fuel level percent via the class 2 serial data circuit to the instrument cluster in order to control the fuel gage. The fuel level information is also used for misfire and evaporative emission (EVAP) diagnostics.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

- The fuel level signal is greater than 99 percent.
- The above condition is present for greater than 20 seconds.

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The LOW FUEL indicator illuminates.
- The PCM records the operating conditions at the time the diagnostic fails. The PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 40 malfunction free warm-up cycles.
- The PCM receives the clear code command from the scan tool.

Diagnostic Aids

- Use the Freeze Frame and/or Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame and/or Failure Records data may aid in determining the number of miles since the DTC set. The Fail Counter and Pass Counter can also aid in determining the

number of ignition cycles that the diagnostic reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions such as RPM, load, vehicle speed, temperature, etc. This will isolate when the DTC failed.

- Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Test Description

The number below refers to the step number on the diagnostic table.

3: Tests for the proper operation of the circuit in the low voltage range.

DTC P0463

Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics Connector End View Reference: Master Electrical Component List				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With a scan tool, observe the Fuel Tank Level Remaining parameter in the PCM Enhanced EVAP Data data list. Does the scan tool indicate that the Fuel Tank Level Remaining parameter is greater than the specified value?	99%	Go to **Step 3**	Go to Diagnostic Aids
3	1. Turn the ignition OFF. 2. Disconnect C104. 3. Connect a 3-ampere fused jumper between the signal circuit of the fuel level sender and the low reference circuit of the fuel level sender on the male terminal side. 4. Turn the ignition ON, with the engine OFF.	1%		

	5. With a scan tool, observe the Fuel Tank Level Remaining parameter. Does the scan tool indicate that the Fuel Tank Level Remaining parameter is less than the specified value?		Go to **Step 6**	Go to **Step 4**
4	Test the signal circuit of the fuel level sender for an open, for a high resistance, or for a short to voltage. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 5**
5	Test the low reference circuit of the fuel level sender for an open, or for a high resistance. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 9**
6	Test the signal circuit of the fuel level sender between C104 and the fuel level sender for an open, for a high resistance, or for a short to voltage. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 7**
7	Test the ground circuit of the fuel level sender between C104 and the fuel level sender for an open, or for a high resistance. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 8**
8	Inspect for poor connections at the harness connector of the fuel level sender. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 10**
	Inspect for poor connections at the harness connector of the powertrain control module (PCM). Refer to **Testing for Intermittent Conditions**			

9	**and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 11**
10	Replace the fuel level sender. Refer to **Fuel Level Sensor Replacement** in Engine Controls - 4.3L. Did you complete the replacement?	-	Go to **Step 12**	-
11	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.3L.Did you complete the replacement?	-	Go to **Step 12**	-
12	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC. Does the DTC reset?	-	Go to **Step 2**	System OK

DTC P0608

Circuit Description

The PCM creates the vehicle speed output signal by pulsing the circuit to ground. The PCM pulses the circuit at the same rate as the vehicle speed signal input. The PCM monitors the voltage on the vehicle speed signal circuit. If the PCM determines the voltage is out of the normal operating range, a DTC sets.

Conditions for Running the DTC

- The engine speed is more than 400 RPM.
- The ignition voltage is between 6.0 volts and 18.0 volts.

Conditions for Setting the DTC

- The PCM detects that the voltage of the vehicle speed signal circuit is out of the normal operating range.
- The condition must be present for a minimum of 5 seconds.

Action Taken When the DTC Sets

- The PCM stores the DTC information in memory when the diagnostic runs and fails.
- The PCM records the operating conditions at the time the diagnostic fails. The PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the MIL/DTC

- The history DTC clears after 40 malfunction free warm-up cycles.
- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The PCM receives the clear code command from the scan tool.

DTC P0608

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics Connector End View Reference: Powertrain Control Module (PCM) Connector End Views in Engine Controls-4.3L, or Instrument Panel, Gages, and Console Connector End Views			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Raise the vehicle's drive wheels. Refer to **Lifting and Jacking the Vehicle** in General Information. 3. Start the engine. 4. Place the transmission into drive for an automatic transmission and third gear for a manual transmission. 5. With the scan tool, observe the Vehicle Speed Sensor parameter in the PCM Engine Data 1 data list. Does the Vehicle Speed Sensor parameter match the speedometer display?	Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
	1. Turn the ignition OFF. 2. Disconnect the PCM connector C2. 3. Install the Signal Generator and Instrument Panel Tester **J 33431-C** lead to the vehicle speed signal circuit		

3	at the PCM harness connector, and the other lead to a good ground. See **Special Tools and Equipment** . 4. Turn the ignition ON, with the engine OFF. 5. Set the Signal Generator and Instrument Panel Tester **J 33431-C** to generate a speedometer signal. See **Special Tools and Equipment** . Does the vehicle speedometer indicate approximately 55 mph (89 km/h)?	Go to **Step 5**	Go to **Step 4**
4	Test the vehicle speed signal circuit for an open, for a short to voltage, or for a short to ground. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 6**
5	Inspect for poor connections at the PCM connector. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 7**
6	Inspect for poor connections at the harness connector of the IPC. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 8**
7	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to **Powertrain Control Module (PCM) Replacement** in Engine Controls.Did you complete the replacement?	Go to **Step 9**	-
8	Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement** . Did you complete the replacement?	Go to **Step 9**	-
	1. Use the scan tool in order to clear the DTC.		

9	2. Operate vehicle within the conditions for running this DTC as specified in the supporting text. Does the DTC reset?	Go to **Step 2**	System OK

DTC P0654

Circuit Description

The powertrain control module (PCM) creates the engine speed output signal by pulsing the circuit to ground. The PCM pulses the circuit at the same rate as the engine speed signal input. The PCM monitors the voltage on the engine speed signal circuit. If the PCM determines the voltage is out of the normal operating range, a DTC sets.

Conditions for Running the DTC

- The engine speed is greater than 400 RPM.
- The ignition voltage is greater than 6 volts, but less than 18 volts.

Conditions for Setting the DTC

- The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.
- The above condition exists for a minimum of 5.0 seconds.

Action Taken When the DTC Sets

- The PCM stores the DTC information into memory when the diagnostic runs and fails.
- The malfunction indicator lamp (MIL) does not illuminate.
- The PCM records the operating conditions at the time the diagnostic fails. The PCM stores this information in the Failure Records.

Conditions for Clearing the MIL/DTC

- A current DTC clears when the diagnostic runs and does not fail.
- A history DTC clears after 40 consecutive malfunction free warm-up cycles.
- The PCM receives the clear code command from the scan tool.

DTC P0654

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics **Connector End View Reference: Instrument Panel, Gages, and Console** **Connector End Views** and **Powertrain Control Module (PCM) Connector End**			

Views in Engine Controls - 4.3L

1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Start the engine. 3. With the scan tool, observe the Engine Speed parameter in the PCM Engine Data 1 data list. Does the Engine Speed parameter match the tachometer display?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
3	1. Turn the ignition OFF. 2. Disconnect the powertrain control module (PCM) connector C2. 3. Install the **J 33431-C** Signal Generator and Instrument Panel Tester lead to the engine speed signal circuit at the PCM harness connector, and the other lead to a good ground. See **Special Tools and Equipment** . 4. Turn the ignition ON, with the engine OFF. 5. Set the **J 33431-C** to generate a tachometer signal. See **Special Tools and Equipment** . Does the vehicle tachometer indicate an RPM reading?	Go to **Step 5**	Go to **Step 4**
4	Test the engine speed signal circuit for an open, for a short to voltage, or for a short to ground. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 6**
5	Inspect for poor connections at the PCM connector. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems.		

	Did you find and correct the condition?	Go to **Step 9**	Go to **Step 7**
6	Inspect for a poor connection at the harness connector of the instrument panel cluster (IPC). Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 8**
7	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.3L.Did you complete the replacement?	Go to **Step 9**	-
8	Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement** . Did you complete the replacement?	Go to **Step 9**	-
9	1. Use the scan tool in order to clear the DTCs. 2. Operate vehicle within the conditions for running this DTC. Does the DTC reset?	Go to **Step 2**	System OK

SYMPTOMS - INSTRUMENT PANEL, GAGES AND CONSOLE

IMPORTANT: The following steps must be completed before using the symptom tables.

1. Perform **Diagnostic System Check - Instrument Cluster** , **Diagnostic System Check - Driver Information Systems** or **Diagnostic System Check - Audible Warnings** before using the Symptom Tables in order to verify that all of the following are true:
   - There are no DTCs set.
   - The control modules can communicate via the class 2 serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to the following:
   - **Instrument Panel Cluster (IPC) Description and Operation**
   - **Indicator/Warning Message Description and Operation**
   - **Audible Warnings Description and Operation**

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the Instrument Cluster or Audible Warning Systems. Refer to **Checking Aftermarket Accessories** in Wiring Systems.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Inspect the reservoirs for the proper fluid level before beginning diagnosis.
- Inspect the applicable reservoir for the proper fluid level related to the indicator or message.
- Verify that the indicators work properly during the displays test.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

Gages and Odometer

- **Engine Coolant Temperature Gage Inaccurate or Inoperative**
- **Engine Oil Pressure Gage Inaccurate or Inoperative**
- **Fuel Gage Inaccurate or Inoperative**
- **Instrument Cluster Inoperative**
- **Odometer Trip/Reset Switch Inoperative**
- **Speedometer and/or Odometer Inaccurate or Inoperative**
- **Tachometer Inaccurate or Inoperative**
- **Volt Gage Inaccurate or Inoperative**

Indicators

- **ABS Indicator Always On** in Anti-lock Brake System
- **ABS Indicator Inoperative** in Anti-lock Brake System
- **Air Bag Indicator Circuit Malfunction** in SIR
- **Brake Warning Indicator Always On** in Hydraulic Brakes
- **Brake Warning Indicator Inoperative** in Hydraulic Brakes
- **Charge Indicator Always On** in Engine Electrical
- **Charge Indicator Inoperative** in Engine Electrical
- **Fasten Safety Belt Indicator/Chime Always On** in Seat Belts

- **Fasten Safety Belt Indicator/Chime Inoperative** in Seat Belts
- **High Beam Indicator Always On** in Lighting Systems
- **High Beam Indicator Inoperative** in Lighting Systems
- **Low Fuel Indicator Inoperative**
- **Malfunction Indicator Lamp (MIL) Inoperative** in Engine Controls - 4.3L
- **Malfunction Indicator Lamp (MIL) Always On** in Engine Controls - 4.3L
- **Rear Hatch/Gate Ajar Indicator Always On** in Body Rear End
- **Rear Hatch/Gate Ajar Indicator Inoperative** in Body Rear End
- **Security Indicator Always On or Flashing** in Theft Deterrent
- **Security Indicator Inoperative** in Theft Deterrent
- **Service Indicator Always On** in Transfer Case - NVG 236-NP8
- **Service Indicator Inoperative** in Transfer Case - NVG 236-NP8
- **Turn Signal Lamps and/or Indicators Always On or Flashing** in Lighting Systems
- **Turn Signal Lamps and/or Indicators Inoperative** in Lighting Systems

Driver Information Center

- **Driver Information Center (DIC) Compass Inaccurate or C Displayed**
- **Driver Information Center (DIC) Inoperative**
- **Driver Information Center (DIC) Switch(es) Inoperative**
- **Driver Information Center (DIC) Temperature Display Always Reads OC**
- **Driver Information Center (DIC) Temperature Display Always Reads SC**
- **Driver Information Center (DIC) Temperature Display Inaccurate or Inoperative**

Instrument Cluster Dimming

- **Interior Backlighting Does Not Dim** in Lighting Systems
- **Interior Backlighting Inoperative** in Lighting Systems

Audible Warning

- **Chime Always On**
- **Chime Inoperative**

INSTRUMENT CLUSTER INOPERATIVE

Instrument Cluster Inoperative

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics			

Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Turn the ignition ON, with the engine OFF. 2. Observe the IPC. Does the IPC perform the displays test?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
3	1. Turn the ignition OFF. 2. Disconnect the IPC. 3. Turn the ignition ON, with the engine OFF. 4. Connect a test lamp between the ignition 1 voltage circuit and a good ground. Does the test lamp illuminate?	Go to **Step 4**	Go to **Step 7**
4	Connect a test lamp between the ignition 1 voltage circuit of the instrument cluster and the ground circuit of the instrument cluster. Does the test lamp illuminate?	Go to **Step 5**	Go to **Step 6**
5	Inspect for poor connections at the harness connector of the IPC. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 8**
6	Repair the open or a high resistance in the ground circuit. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you complete the repair?	Go to **Step 9**	-
7	Repair the open, short to ground or a high resistance in the ignition 1 voltage circuit. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you complete the repair?	Go to **Step 9**	-
	Replace the IPC. Refer to **Instrument**		

8	**Panel Cluster (IPC) Replacement** . Did you complete the replacement?	Go to **Step 9**	-
9	Operate the system in order to verify the repair. Did you find and correct the condition?	System OK	Go to **Step 3**

ENGINE COOLANT TEMPERATURE GAGE INACCURATE OR INOPERATIVE

Engine Coolant Temperature Gage Inaccurate or Inoperative

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With the scan tool, perform the Coolant Gauge Sweep Test. Does the engine coolant temperature gage move up and down when commanded?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
3	Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement** . Did you complete the replacement?	Go to **Step 4**	-
4	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

ENGINE OIL PRESSURE GAGE INACCURATE OR INOPERATIVE

Test Description

The numbers below refer to the step numbers on the diagnostic table.

3: This step tests for a short to ground in the signal circuit.

4: This step tests for an open, for a high resistance, or for a short to voltage in the signal circuit. If the fuse in the jumper opens when you perform this test, the signal circuit is shorted to voltage.

Engine Oil Pressure Gage Inaccurate or Inoperative

Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	Start the engine. Does the engine oil pressure gage display that the engine oil pressure is within the specified range?	10-70 psi (69-483 kPa)	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
3	1. Turn the ignition OFF. 2. Disconnect the engine oil pressure sensor. 3. Start the engine. Does the engine oil pressure gage display at or above the specified value?	80 psi (550 kPa)	Go to **Step 4**	Go to **Step 6**
4	1. Turn the ignition OFF. 2. Connect a 3 ampere fused jumper between the signal circuit of the engine oil pressure sensor and a good ground. 3. Start the engine. Does the engine oil pressure gage display at or below the specified value?	0 psi (0 kPa)	Go to **Step 7**	Go to **Step 5**
5	Test the signal circuit of the engine oil pressure sensor for an open, for a high resistance, or for a short to voltage. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the	-		

	condition?		Go to **Step 12**	Go to **Step 9**
6	Test the signal circuit of the engine oil pressure sensor for a short to ground. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 9**
7	Inspect for a high resistance or for a poor connection at the case ground of the engine oil pressure sensor. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 8**
8	Inspect for poor connections at the harness connector of the engine oil pressure sensor. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 10**
9	Inspect for poor connections at the harness connector of the IPC. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 12**	Go to **Step 11**
10	Replace the engine oil pressure sensor. Refer to **Engine Oil Pressure Sensor and/or Switch Replacement** in Engine Mechanical - 4.3L. Did you complete the replacement?	-	Go to **Step 12**	-
11	Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement** . Did you complete the replacement?	-	Go to **Step 12**	-
12	Operate the system in order to verify the repair. Did you correct the condition?	-	System OK	Go to **Step 2**

FUEL GAGE INACCURATE OR INOPERATIVE

Diagnostic Aids

- Ensure that the fuel level is in the same range as the customer concern.
- For intermittent diagnosis, refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.
- Refer to **Fuel Level Specifications** in order to verify the correct fuel level sensor readings. The Fuel Tank Level Remaining parameter is available in the scan tool in the powertrain control module (PCM) data list.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

3: This step tests for a high resistance in the signal circuit and the low reference circuit of the fuel level sensor.

13: DTCs will be set in the PCM when you perform this diagnostic table.

Fuel Gage Inaccurate or Inoperative

Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics Connector End View Reference: Master Electrical Component List				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Disconnect C104. 2. Connect the **J 33431-C** Signal Generator and Instrument Panel Tester between the signal circuit of the fuel level sensor and the low reference circuit of the fuel level sensor on the male terminal side. See **Special Tools and Equipment** . 3. Turn the ignition ON, with the engine OFF. **IMPORTANT:** **Verify the J 33431-C resistance**	-		

	settings with a DMM. See Special Tools and Equipment . 4. Vary the resistance on the **J 33431-C** from 40-250 ohm. See **Special Tools and Equipment** . 5. Refer to **Fuel Level Specifications** in order to convert from resistance to fuel gage display. Does the fuel gage display the correct fuel level?		Go to **Step 4**	Go to **Step 3**
3	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. **IMPORTANT:** **Verify the J 33431-C resistance settings with a digital multimeter (DMM). See Special Tools and Equipment .** 3. Vary the resistance on the **J 33431-C** from 40-250 ohm. See **Special Tools and Equipment** . 4. Refer to **Fuel Level Specifications** in order to convert from resistance to fuel level percent. **IMPORTANT:** **Turn the ignition OFF momentarily between the resistance settings in order to quickly update the scan tool display.** 5. With the scan tool, observe the Fuel Tank Level Remaining parameter in the PCM Enhanced EVAP Data data list. Does the scan tool display the correct fuel level percentage?	-	Go to **Step 11**	Go to **Step 5**
	Inspect for the following items:			

4	• A poor connection at the harness connector of the fuel level sensor Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. • A high resistance in the signal circuit of the fuel level sensor or the low reference circuit of the fuel level sensor between the fuel level sensor and C104 • A misaligned fuel sender • A deformed fuel tank Did you find and correct the condition?	-	Go to **Step 13**	Go to **Step 7**
5	Test the signal circuit of the fuel level sensor for a high resistance. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 13**	Go to **Step 6**
6	Test the low reference circuit of the fuel level sensor for a high resistance. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 13**	Go to **Step 9**
7	1. Remove the fuel level sender. 2. Inspect for the following items: • A stuck fuel level sender, i.e. the fuel strainer interfering with the sender float arm • Foreign material in the fuel tank, i.e. ice Did you find and correct the condition?	-	Go to **Step 13**	Go to **Step 8**
	1. With the **J 39200** DMM, measure the resistance of the fuel level			

8	sensor while moving the float arm. 2. Observe both the analog and digital displays on the DMM. Does the resistance change smoothly across the specified range?	40-250 ohm	Go to Diagnostic Aids	Go to **Step 10**
9	Inspect for poor connections at the harness connector of the powertrain control module (PCM). Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 13**	Go to **Step 12**
10	Replace the fuel level sensor. Refer to **Fuel Level Sensor Replacement** in Engine Controls - 4.3L. Did you complete the replacement?	-	Go to **Step 13**	-
11	Replace the instrument panel cluster (IPC). Refer to **Instrument Panel Cluster (IPC) Replacement** . Did you complete the replacement?	-	Go to **Step 13**	-
12	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.3L.Did you complete the replacement?	-	Go to **Step 13**	-
13	1. Use the scan tool in order to clear the PCM DTCs. 2. Operate the system in order to verify the repair. Did you correct the condition?	-	System OK	Go to **Step 2**

ODOMETER TRIP/RESET SWITCH INOPERATIVE

Odometer Trip/Reset Switch Inoperative

Step	Action	Yes	No

Schematic Reference: Instrument Cluster Schematics			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	Activate the trip reset button. Does the odometer display switch between trip and odometer?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
3	Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement** . Did you complete the replacement?	Go to **Step 4**	-
4	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 3**

SPEEDOMETER AND/OR ODOMETER INACCURATE OR INOPERATIVE

Speedometer and/or Odometer Inaccurate or Inoperative

Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics **Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views , Powertrain Control Module (PCM) Connector End Views**				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Raise the vehicle drive wheels. Refer to **Lifting and Jacking the Vehicle** in General Information. 3. Start the engine. 4. Place the transmission into drive for an automatic transmission or third gear for a manual transmission.	-		

	5. With the scan tool, observe the Vehicle Speed parameter in the PCM Engine Data 1 data list. Does the Vehicle Speed parameter match the speedometer display?		Go to **Step 3**	Go to **Step 4**
3	Does the odometer operate properly?	-	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 9**
4	1. Turn the ignition OFF. 2. Disconnect the powertrain control module (PCM) connector C2. 3. Turn the ignition ON. 4. Measure the voltage from the vehicle speed signal circuit to a good ground. Does the voltage measure greater than the specified value?	9.0 V	Go to **Step 7**	Go to **Step 5**
5	Test the vehicle speed signal circuit for an open or for a high resistance between the instrument panel cluster (IPC) and the PCM. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 6**
6	Inspect for poor connections at the harness connector of the IPC. Refer to **Testing for Intermittent Conditions and Poor Connections** and to**Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 9**
	Test the vehicle speed signal circuit			

7	for a short to voltage between the IPC and the PCM. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 8**
8	Inspect for poor connections at the harness connector of the PCM. Refer to **Testing for Intermittent Conditions and Poor Connections** and to**Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 11**	Go to **Step 10**
9	Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement** . Did you complete the replacement?	-	Go to **Step 11**	-
10	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.3L.Did you complete the replacement?	-	Go to **Step 11**	-
11	Operate the system in order to verify the repair. Did you correct the condition?	-	System OK	Go to **Step 2**

TACHOMETER INACCURATE OR INOPERATIVE

Tachometer Inaccurate or Inoperative

Step	Action	Value(s)	Yes	No
Schematic Reference: Instrument Cluster Schematics Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views , Powertrain Control Module (PCM) Connector End Views				
1	Did you perform the Instrument Cluster Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**

2	1. Install a scan tool. 2. Start the engine. 3. With the scan tool, observe the Engine Speed parameter in the PCM Engine Data 1 data list. Does the Engine Speed parameter match the tachometer display?	-	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
3	1. Turn the ignition OFF. 2. Disconnect the powertrain control module (PCM) connector C2. 3. Turn the ignition ON, with the engine OFF. 4. Measure the voltage from the engine speed signal circuit to a good ground. Does the voltage measure greater than the specified value?	9.0 V	Go to **Step 6**	Go to **Step 4**
4	Test the engine speed signal circuit for an open or for a high resistance. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 5**
5	Inspect for poor connections at the harness connector of the instrument panel cluster (IPC). Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 8**
6	Test the engine speed signal circuit for a short to voltage. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 7**
	Inspect for poor connections at the harness connector of the PCM. Refer			

7	to **Testing for Intermittent Conditions and Poor Connections** and to**Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 9**
8	Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement** . Did you complete the replacement?	-	Go to **Step 10**	-
9	**IMPORTANT:** **Program the replacement PCM.** Replace the PCM. Refer to **Powertrain Control Module (PCM) Replacement** in Engine Controls - 4.3L.Did you complete the replacement?	-	Go to **Step 10**	-
10	Operate the system in order to verify the repair. Did you correct the condition?	-	System OK	Go to **Step 2**

VOLT GAGE INACCURATE OR INOPERATIVE

Volt Gage Inaccurate or Inoperative

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. Compare the scan tool Battery Voltage parameter in the BCM Data data list to the volt gage display. Does the Battery Voltage parameter approximately match the volt gage display?	Go to **Diagnostic System Check - Engine Electrical** in Engine Electrical	Go to **Step 3**
	Replace the IPC. Refer to **Instrument**		

3	**Panel Cluster (IPC) Replacement** . Did you complete the replacement?	Go to **Step 4**	-
4	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

LOW FUEL INDICATOR INOPERATIVE

Low Fuel Indicator Inoperative

Step	Action	Yes	No
Schematic Reference: Instrument Cluster Schematics			
1	Did you perform the Instrument Cluster Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Instrument Cluster**
2	1. Install a scan tool. 2. Turn the ignition ON, with the engine OFF. 3. With the scan tool, perform the Lamp Test in the Instrument Panel Cluster Special Functions. Does the low fuel indicator illuminate when commanded ON?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
3	Replace the IPC. Refer to **Instrument Panel Cluster (IPC) Replacement** . Did you complete the replacement?	Go to **Step 4**	-
4	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

DRIVER INFORMATION CENTER (DIC) INOPERATIVE

Diagnostic Aids

The DIC displays dashes (- -) when there is a fault in the class 2 serial data circuit. This occurs only during the following modes:

- Average Fuel Economy
- Average Speed
- Fuel Used

- Instant Fuel Economy
- Trip Range

The compass display and the temperature display still operate normally when there is a fault in the class 2 serial data circuit. In this case refer to **Scan Tool Does Not Communicate with Class 2 Device** in Data Link Communications for diagnosis.

Driver Information Center (DIC) Inoperative

Step	Action	Yes	No
Schematic Reference: Driver Information System Schematics Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views			
1	Did you perform the Driver Information Systems Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Driver Information Systems**
2	Test the IP lamp supply voltage circuit of the DIC for an open. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 8**	Go to **Step 3**
3	Test the battery positive voltage circuit of the DIC for an open. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 8**	Go to **Step 4**
4	Test the RAP fuse supply voltage circuit of the DIC for an open. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 8**	Go to **Step 5**
5	Test the ground circuit of the DIC for an open. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 8**	Go to **Step 6**
6	Inspect for poor connections at the harness connector of the DIC. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 8**	Go to **Step 7**

7	**IMPORTANT:** **Perform the compass calibration and variance procedure on the replacement DIC.** Replace the DIC. Refer to **Driver Information Center Module Replacement** .Did you complete the replacement?	Go to **Step 8**	-
8	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

DRIVER INFORMATION CENTER (DIC) TEMPERATURE DISPLAY ALWAYS READS SC

Diagnostic Aids

- The DIC displays SC when there is a shorted condition within the system.
- For intermittent diagnosis, refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.
- Refer to **Ambient Air Temperature Sensor Resistance** in order to verify the correct ambient temperature sensor readings.

Driver Information Center (DIC) Temperature Display Always Reads SC

Step	Action	Yes	No
Schematic Reference: Driver Information System Schematics Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views			
1	Did you perform the Driver Information Systems Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Driver Information Systems**
	1. Disconnect the ambient temperature sensor. 2. Connect the **J 33431-C** Signal Generator and Instrument Panel Tester between the signal circuit of the ambient temperature sensor and the ground circuit of the ambient temperature sensor. See **Special Tools and Equipment** . 3. Turn the ignition ON, with the engine OFF.		

2	**IMPORTANT:** **Verify the J 33431-C resistance settings with a DMM. See Special Tools and Equipment .** **Disconnect one of the J 33431-C leads momentarily between the resistance settings in order to quickly update the DIC display. See Special Tools and Equipment .** 4. Vary the resistance on the **J 33431-C** from 2500-11200 ohm. See **Special Tools and Equipment** . 5. Refer to **Ambient Air Temperature Sensor Resistance** in order to convert from resistance to DIC temperature display. Does the DIC display the correct temperature?	Go to **Step 4**	Go to **Step 3**
3	Test the signal circuit of the ambient temperature sensor for a short to ground. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 7**	Go to **Step 6**
4	Inspect for a poor connection at the harness connector of the ambient temperature sensor. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 7**	Go to **Step 5**
5	Replace the ambient temperature sensor. Refer to **Ambient Air Temperature Gage Sensor Replacement** . Did you complete the replacement?	Go to **Step 7**	-
6	**IMPORTANT:** **Perform the compass calibration and variance procedure on the replacement DIC.** Replace the DIC. Refer to **Driver Information Center Module Replacement** .Did you complete the replacement?	Go to **Step 7**	-
7	Operate the system in order to verify the repair.		

	Did you correct the condition?	System OK	Go to **Step 2**

DRIVER INFORMATION CENTER (DIC) TEMPERATURE DISPLAY ALWAYS READS OC

Diagnostic Aids

- The DIC displays OC when there is an open condition within the system.
- For intermittent diagnosis, refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.
- Refer to **Ambient Air Temperature Sensor Resistance** in order to verify the correct ambient temperature sensor readings.

Driver Information Center (DIC) Temperature Display Always Reads OC

Step	Action	Yes	No
Schematic Reference: Driver Information System Schematics Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views			
1	Did you perform the Driver Information Systems Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Driver Information Systems**
2	1. Disconnect the ambient temperature sensor. 2. Connect the **J 33431-C** Signal Generator and Instrument Panel Tester between the signal circuit of the ambient temperature sensor and the ground circuit of the ambient temperature sensor. See **Special Tools and Equipment** . 3. Turn the ignition ON, with the engine OFF. **IMPORTANT:** **Verify the J 33431-C resistance settings with a DMM. See Special Tools and Equipment .** **Disconnect one of the J 33431-C leads momentarily between the resistance settings in order to quickly update the DIC display. See Special Tools and Equipment .** 4. Vary the resistance on the **J 33431-C**		

	from 2500-11200 ohm. See **Special Tools and Equipment** . 5. Refer to **Ambient Air Temperature Sensor Resistance** in order to convert from resistance to DIC temperature display. Does the DIC display the correct temperature?	Go to **Step 5**	Go to **Step 3**
3	Test the signal circuit of the ambient temperature sensor for an open. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 4**
4	Test the ground circuit of the ambient temperature sensor for an open. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 6**
5	Inspect for poor connections at the harness connector of the ambient temperature sensor. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 7**
6	Inspect for poor connections at the harness connector of the DIC. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 8**
7	Replace the ambient temperature sensor. Refer to **Ambient Air Temperature Gage Sensor Replacement** . Did you complete the replacement?	Go to **Step 9**	-
8	**IMPORTANT:** **Perform the compass calibration and variance procedure on the replacement DIC.** Replace the DIC. Refer to **Driver Information Center Module Replacement** .Did you complete the replacement?	Go to **Step 9**	-

9	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

DRIVER INFORMATION CENTER (DIC) TEMPERATURE DISPLAY INACCURATE OR INOPERATIVE

Diagnostic Aids

- An inaccurate DIC temperature display indicates a high resistance condition within the system.
- For intermittent diagnosis, refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.
- Refer to **Ambient Air Temperature Sensor Resistance** in order to verify the correct ambient temperature sensor readings.

Driver Information Center (DIC) Temperature Display Inaccurate or Inoperative

Step	Action	Yes	No
Schematic Reference: Driver Information System Schematics Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views			
1	Did you perform the Driver Information Systems Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Driver Information Systems**
2	1. Disconnect the ambient temperature sensor connector. 2. Connect the **J 33431-C** Signal Generator and Instrument Panel Tester between the signal circuit of the ambient temperature sensor and the ground circuit of the ambient temperature sensor. See **Special Tools and Equipment** . 3. Turn the ignition ON, with the engine OFF. **IMPORTANT:** **Verify the J 33431-C resistance settings with a DMM. See Special Tools and Equipment .** **Disconnect one of the J 33431-C leads momentarily between the resistance**		

	settings in order to quickly update the DIC display. See Special Tools and Equipment . 4. Vary the resistance on the **J 33431-C** from 2500-11200 ohm. See **Special Tools and Equipment** . 5. Refer to **Ambient Air Temperature Sensor Resistance** in order to convert from resistance to DIC temperature display. Does the DIC display the correct temperature?	Go to **Step 5**	Go to **Step 3**
3	Test the signal circuit of the ambient temperature sensor for a high resistance. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 4**
4	Test the ground circuit of the ambient temperature sensor for a high resistance. Refer to **Circuit Testing** and to **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 6**
5	Inspect for poor connections at the harness connector of the ambient temperature sensor. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 7**
6	Inspect for poor connections at the harness connector of the DIC. Refer to **Testing for Intermittent Conditions and Poor Connections** and to **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 8**
7	Replace the ambient temperature sensor. Refer to **Ambient Air Temperature Gage Sensor Replacement** . Did you complete the replacement?	Go to **Step 9**	-
8	**IMPORTANT:** **Perform the compass calibration and variance procedure on the replacement DIC.**		

	Replace the DIC. Refer to **Driver Information Center Module Replacement** .Did you complete the replacement?	Go to **Step 9**	
9	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

DRIVER INFORMATION CENTER (DIC) COMPASS INACCURATE OR C DISPLAYED

Driver Information Center (DIC) Compass Inaccurate or C Displayed

Step	Action	Yes	No
Schematic Reference: Driver Information System Schematics			
1	Did you perform the Driver Information Systems Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Driver Information Systems**
2	Verify that the compass is inaccurate or that CAL or C is displayed. Does the system operate normally?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
3	Turn the ignition ON, with the engine OFF. Is the compass display blank?	Go to **Step 7**	Go to **Step 4**
4	Is CAL or C displayed?	Go to **Step 5**	Go to **Step 6**
5	Perform the compass calibration procedure. Refer to **Electronic Compass Calibration** . Does the compass operate properly?	Go to **Step 8**	Go to **Step 6**
6	Perform the compass variance procedure. Refer to **Electronic Compass Calibration** . Does the compass operate properly?	Go to **Step 8**	Go to **Step 7**
7	**IMPORTANT:** **Perform the compass calibration and variance procedure on the replacement DIC.** Replace the DIC. Refer to **Driver Information Center Module Replacement** .Did you complete the		-

	replacement?	Go to **Step 8**	
8	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

DRIVER INFORMATION CENTER (DIC) SWITCH(ES) INOPERATIVE

Driver Information Center (DIC) Switch(es) Inoperative

Step	Action	Yes	No
Schematic Reference: Driver Information System Schematics			
1	Did you perform the Driver Information Systems Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Driver Information Systems**
2	Press each of the DIC switches. Do the switches operate normally?	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems	Go to **Step 3**
3	**IMPORTANT:** **Perform the compass calibration and variance procedure on the replacement DIC.** Replace the DIC. Refer to **Driver Information Center Module Replacement** .Did you complete the replacement?	Go to **Step 4**	-
4	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

CHIME ALWAYS ON

Chime Always On

Step	Action	Yes	No
Schematic Reference: Audible Warnings Schematics **Connector End View Reference: Instrument Panel, Gages, and Console Connector End Views or Body Control System Connector End Views**			
1	Did you perform the Audible Warnings Diagnostic System Check?		Go to **Diagnostic System Check -**

		Go to **Step 2**	**Audible Warnings**
2	1. Turn the headlamps OFF. 2. Turn the ignition OFF. 3. Remove the key from the ignition. 4. Close all doors. Does the chime sound?	Go to **Step 3**	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems
3	Do any indicators illuminate when the chime sounds?	Go to **Symptoms - Instrument Panel, Gages and Console**	Go to **Step 4**
4	1. Install a scan tool. 2. Observe the Key in Ignition parameter in the BCM Input 1 data List. 3. Insert and remove the key from the ignition. Does the Key in Ignition parameter change states?	Go to **Step 8**	Go to **Step 5**
5	Test the key in ignition signal circuit for a short to ground. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 6**
6	Inspect for poor connections at the harness connector of the ignition key alarm switch. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 9**	Go to **Step 7**
7	Replace the ignition switch. Refer to **Ignition Switch Replacement** in Steering Wheel and Column. Did you complete the replacement?	Go to **Step 9**	-
8	**IMPORTANT:** **Program the replacement BCM.** Replace the BCM. Refer to **Body Control Module Replacement** in Body Control System.Did you complete the replacement?	Go to **Step 9**	-

9	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 3**

CHIME INOPERATIVE

Chime Inoperative

Step	Action	Yes	No
Schematic Reference: Audible Warnings Schematics DEFINITION: One or more chime functions are inoperative.			
1	Did you perform the Audible Warning Diagnostic System Check?	Go to **Step 2**	Go to **Diagnostic System Check - Audible Warnings**
2	**IMPORTANT:** **Perform the set up procedure for the replacement BCM.** Replace the BCM. Refer to **Body Control Module Replacement** in Body Control System.Did you complete the replacement?	Go to **Step 3**	-
3	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 1**

REPAIR INSTRUCTIONS

AMBIENT AIR TEMPERATURE GAGE SENSOR REPLACEMENT

Removal Procedure

1. Remove the radiator grille. Refer to **Grille Replacement (GMC)** or **Grille Replacement (Chevrolet)** in Exterior Trim.

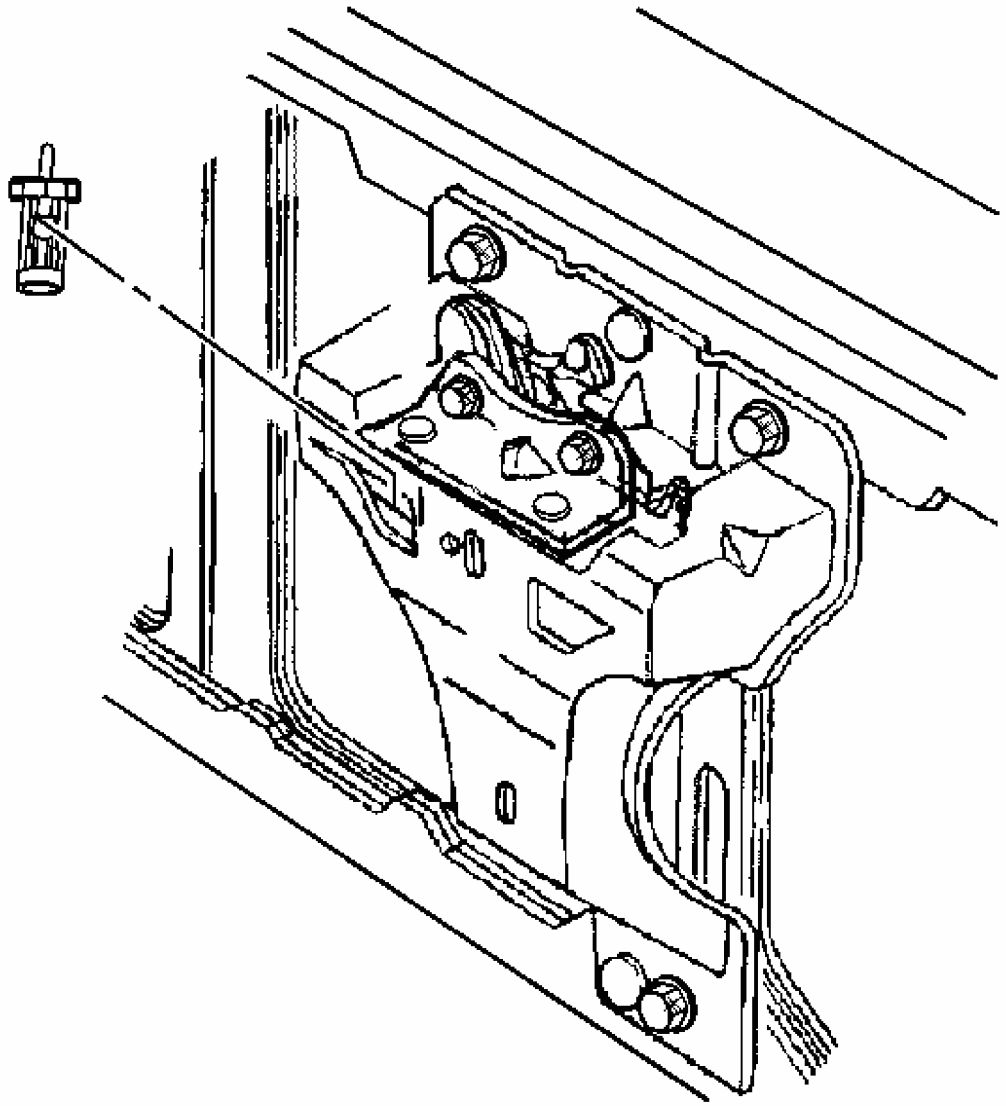


Fig. 14: View Of Temperature Sensor
Courtesy of GENERAL MOTORS CORP.

2. Lift the temperature sensor upward in order to remove the temperature sensor.
3. Disconnect the electrical connector.

Installation Procedure

1. Connect the electrical connector.

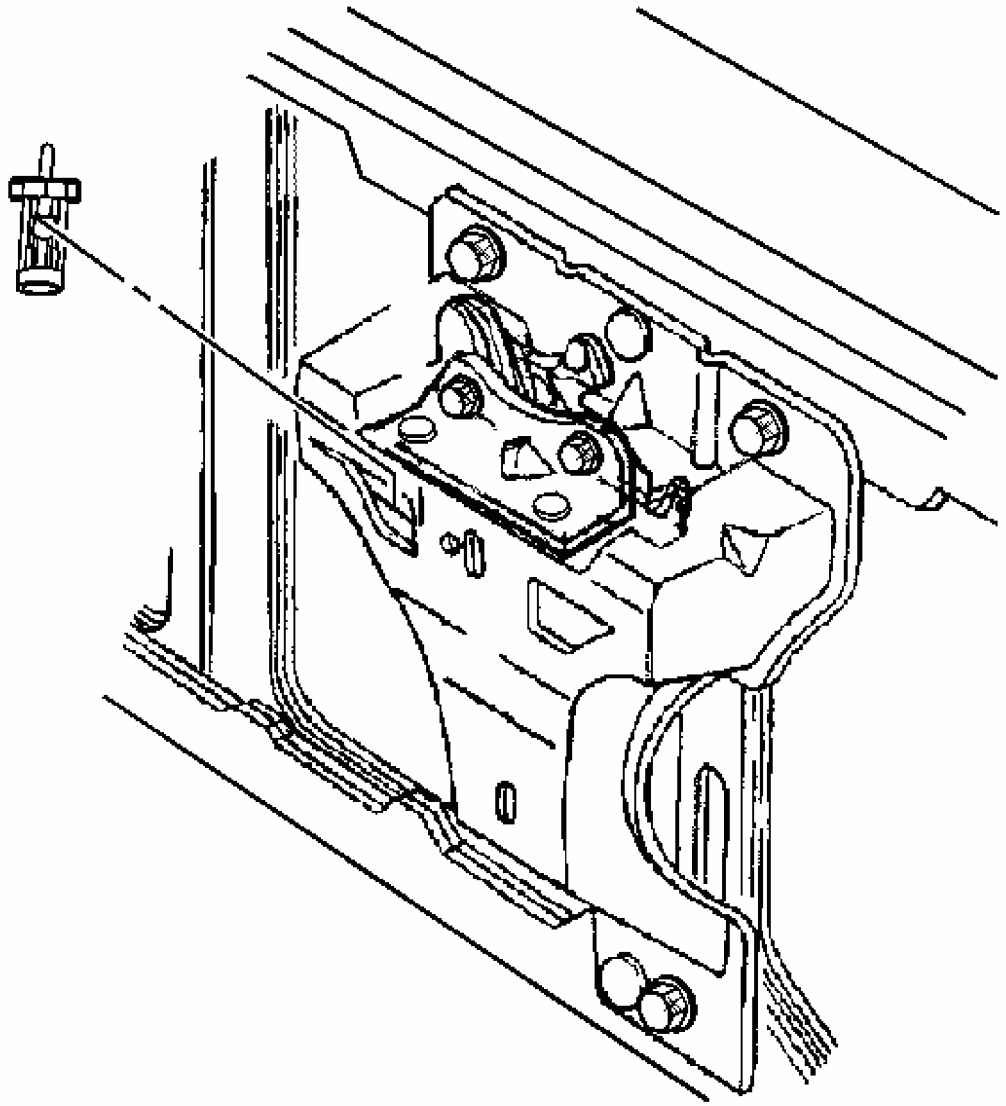


Fig. 15: View Of Temperature Sensor
Courtesy of GENERAL MOTORS CORP.

2. Install the temperature sensor by sliding the temperature sensor downward.
3. Install the radiator grille. Refer to **Grille Replacement (GMC)** or **Grille Replacement (Chevrolet)** in Exterior Trim.

ELECTRONIC COMPASS CALIBRATION

Compass Calibration

IMPORTANT: Before calibrating the compass, drive the vehicle to a area that is magnetically clean, and free of large metallic objects.

1. Turn ON the ignition.
2. Press the MODE button in order to advance to the COMP/TEMP mode.
3. Simultaneously depress and hold the US/MET and MODE buttons until a C is displayed, in approximately 10 seconds.
4. Release both buttons.
5. Drive the vehicle in circles at a speed of less than 8 km/h (5 mph) until the C is replaced by a proper vehicle heading. The calibration procedure is now complete.

Compass Magnetic Variation Adjustment

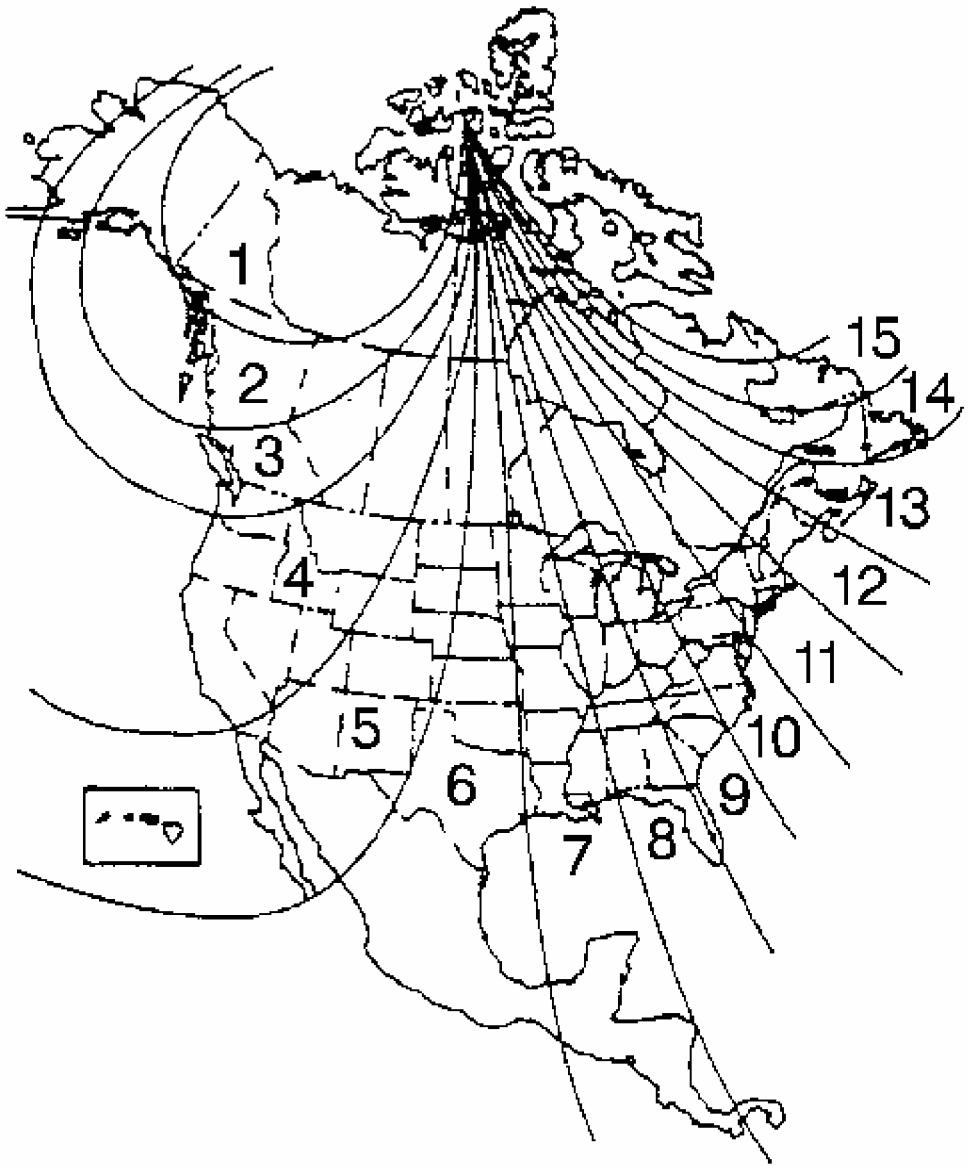


Fig. 16: View Of Variation Zone Map
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Magnetic variation adjustments are required when the compass displays a constant error in heading. Variation is the difference between magnetic north and true north due to geographical location.

1. Locate your geographic location. Refer to the variation zone map.
2. Turn ON the ignition, with the engine OFF.
3. Press the MODE button in order to advance to the COMP/TEMP mode.
4. With the DIC in the COMP/TEMP mode, simultaneously depress and hold the MODE and US/MET buttons until VAR CAL is displayed, in approximately 5 seconds.
5. Release both buttons.
6. Press the US/MET button in order to advance to the proper zone number.
7. Press the MODE button in order to enter and set the zone number.

ELECTRONIC COMPASS MODULE REPLACEMENT

Removal Procedure

Due to the complexity of the compass system and the extent of outside influences on the compass' performance, thoroughly inspect the system prior to performing repairs.

Inspect the compass in an area that is free from potential interference such as in an open field. Inspect that the compass is calibrated in order to verify the existence of a problem.

1. Remove the overhead console. Refer to **Driver Information Center Replacement (Without Sunroof)** or **Driver Information Center Replacement (With Sunroof)** .

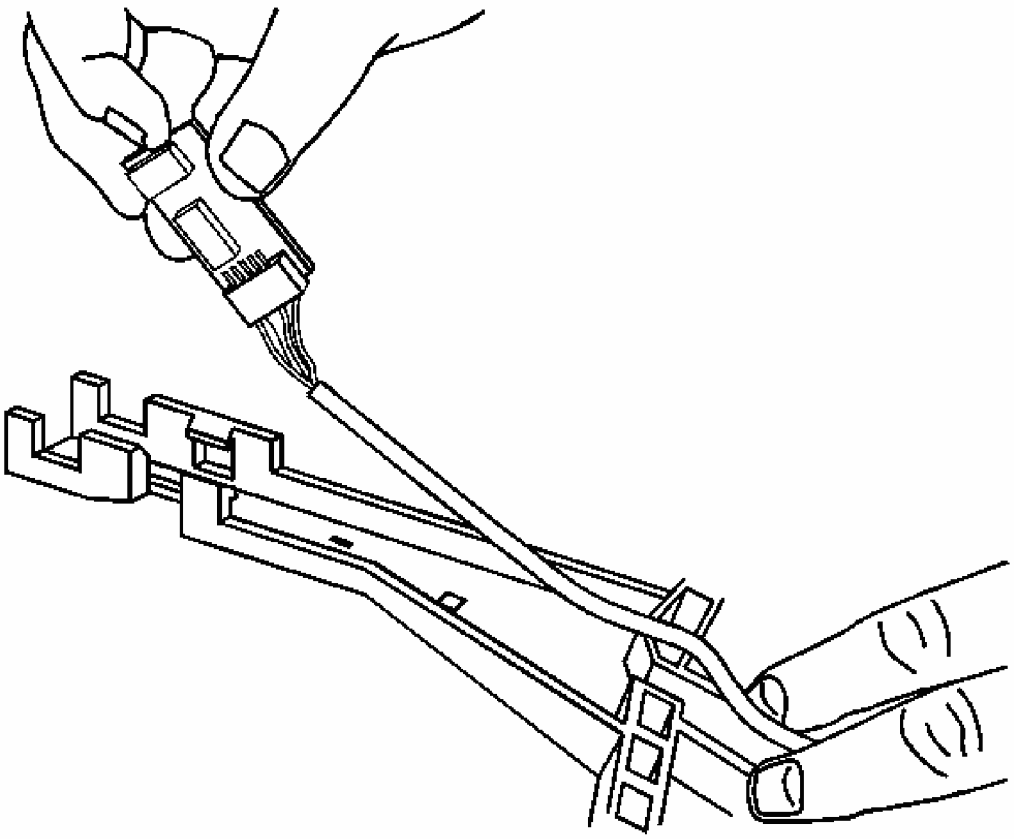


Fig. 17: View Of Electronic Compass Sensor
Courtesy of GENERAL MOTORS CORP.

2. Remove the compass sensor from the overhead console.

Installation Procedure

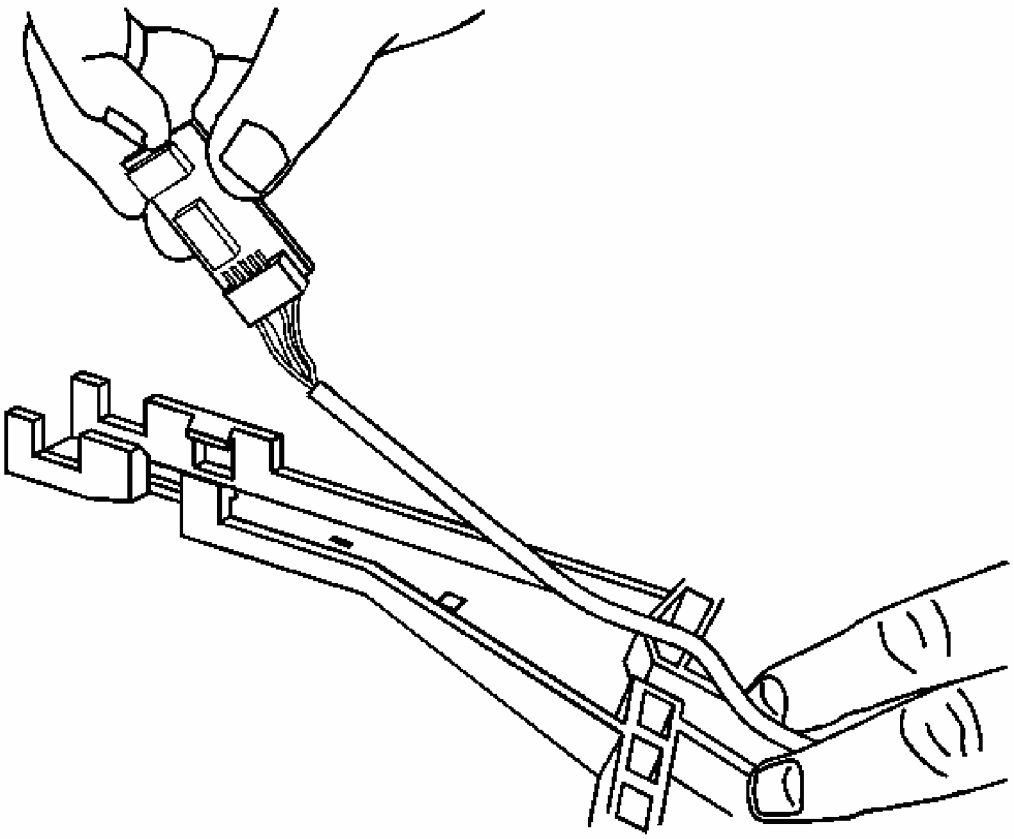


Fig. 18: View Of Electronic Compass Sensor
Courtesy of GENERAL MOTORS CORP.

1. Install the compass sensor to the overhead console.
2. Install the overhead console. Refer to **Driver Information Center Replacement (Without Sunroof)** or **Driver Information Center Replacement (With Sunroof)** .
3. Calibrate the compass. Refer to **Electronic Compass Calibration** .

CLOSEOUT/INSULATOR PANEL REPLACEMENT - RIGHT

Removal Procedure

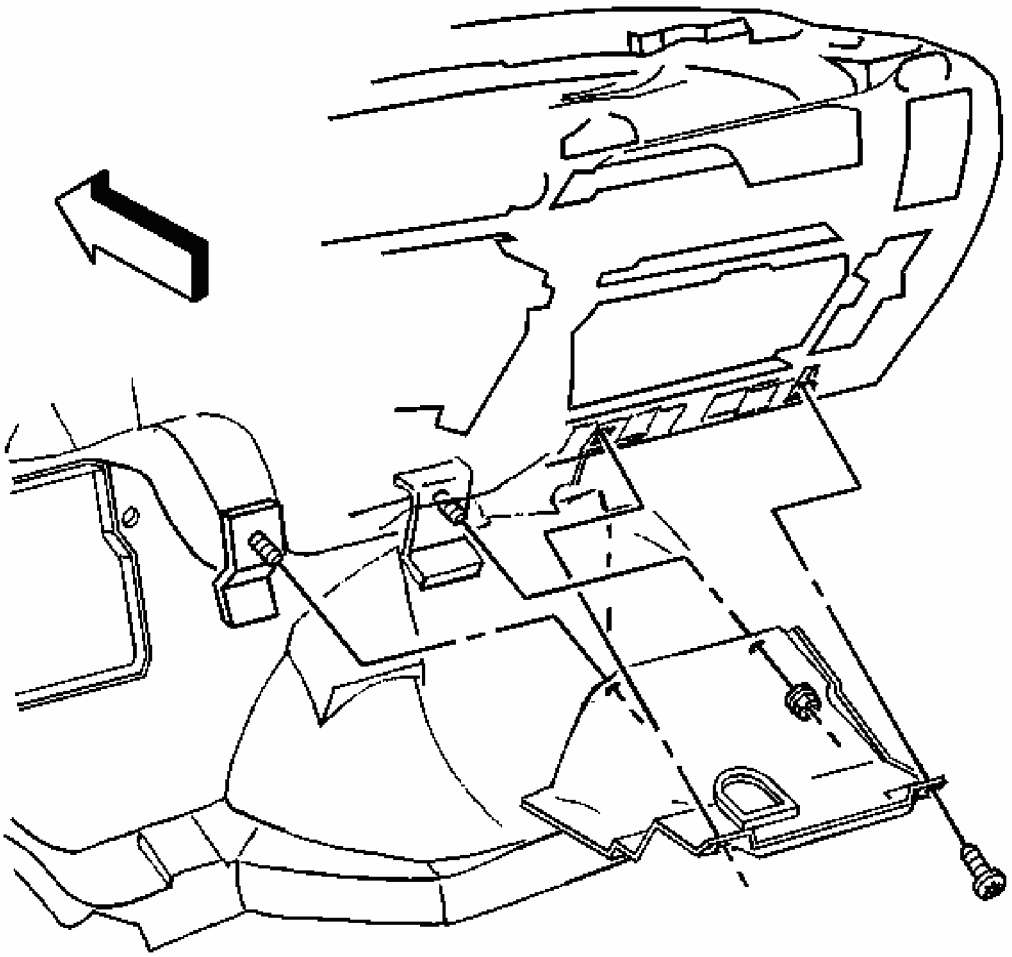


Fig. 19: View Of Instrument Panel Sound Insulator
Courtesy of GENERAL MOTORS CORP.

1. Remove the screws that retain the instrument panel sound insulator to the following components:
   - The instrument panel
   - The cowl
2. Remove the instrument panel sound insulator from the vehicle.

Installation Procedure

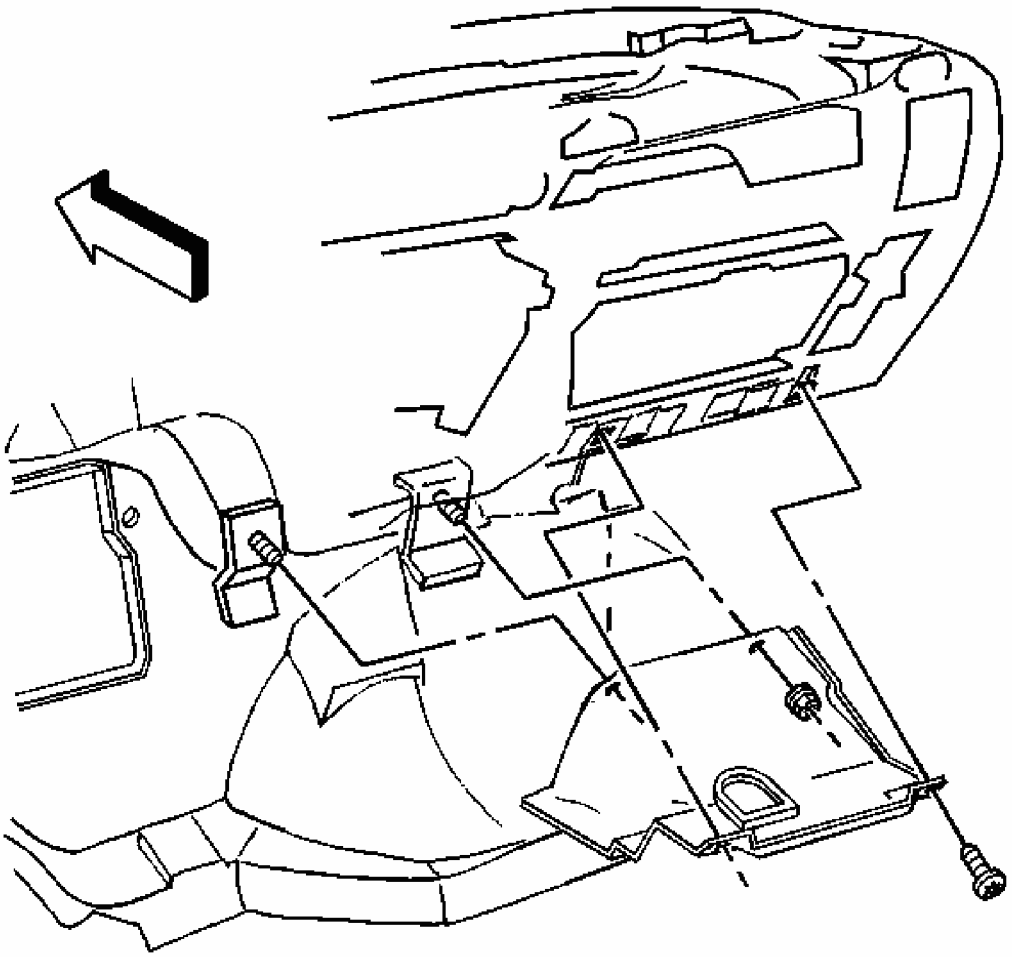


Fig. 20: View Of Instrument Panel Sound Insulator
Courtesy of GENERAL MOTORS CORP.

1. Install the instrument panel sound insulator to the vehicle.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the screws that retain the instrument panel sound insulator to the following components:
   - The instrument panel
   - The cowl

   Tighten: Tighten the screws to 1.9 N.m (17 lb in).

CLOSEOUT/INSULATOR PANEL REPLACEMENT - LEFT

Removal Procedure

1. Remove the screws that retain the data link connector (DLC) to the instrument panel sound insulator.

   Feed the DLC lines through the hole in the sound insulator.

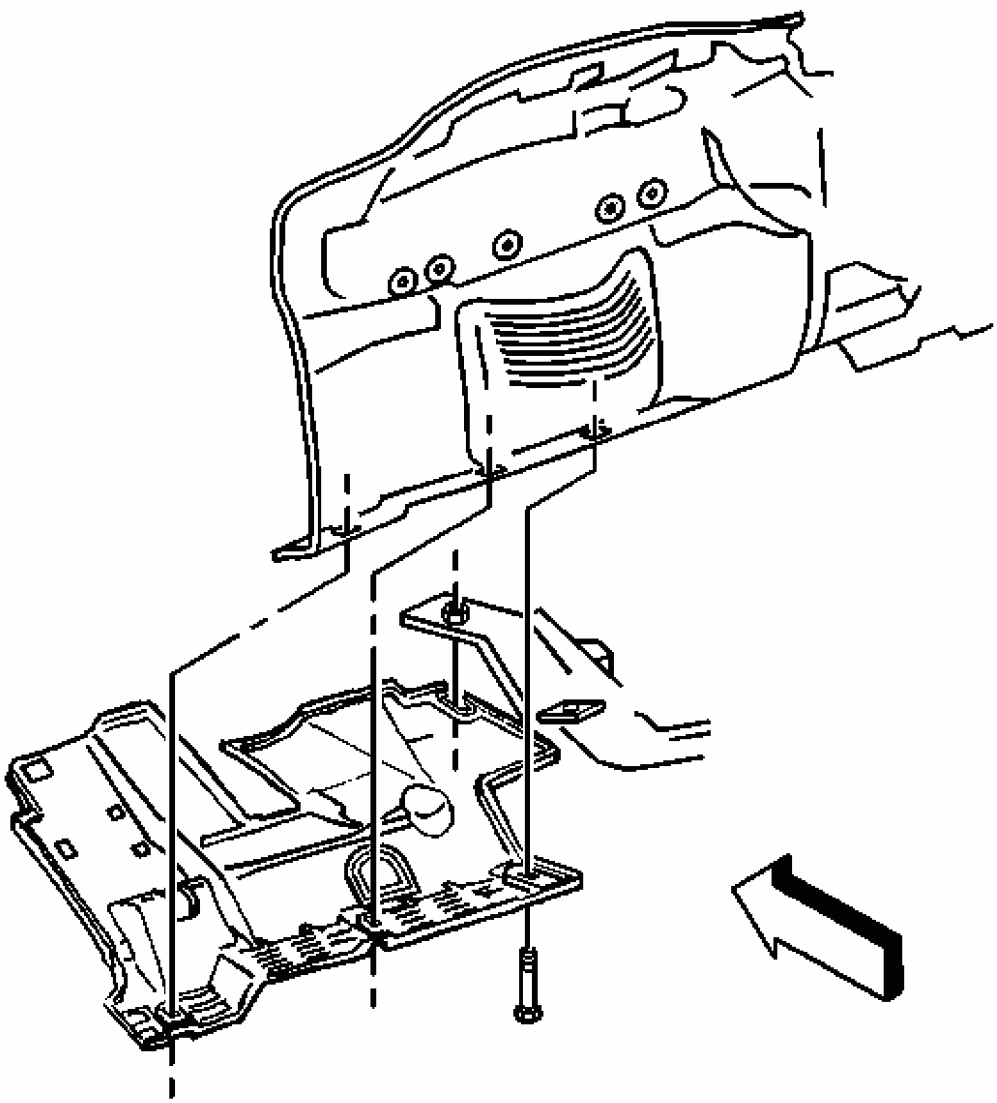


Fig. 21: View Of Instrument Panel Sound Insulator
Courtesy of GENERAL MOTORS CORP.

2. Remove the screws that retain the instrument panel sound insulator to the knee bolster and the cowl panel.
3. Disconnect the electrical connectors from the remote control door lock receiver module.
4. Remove and retain the remote control door lock receiver module from the instrument panel sound insulator (if equipped).

Installation Procedure

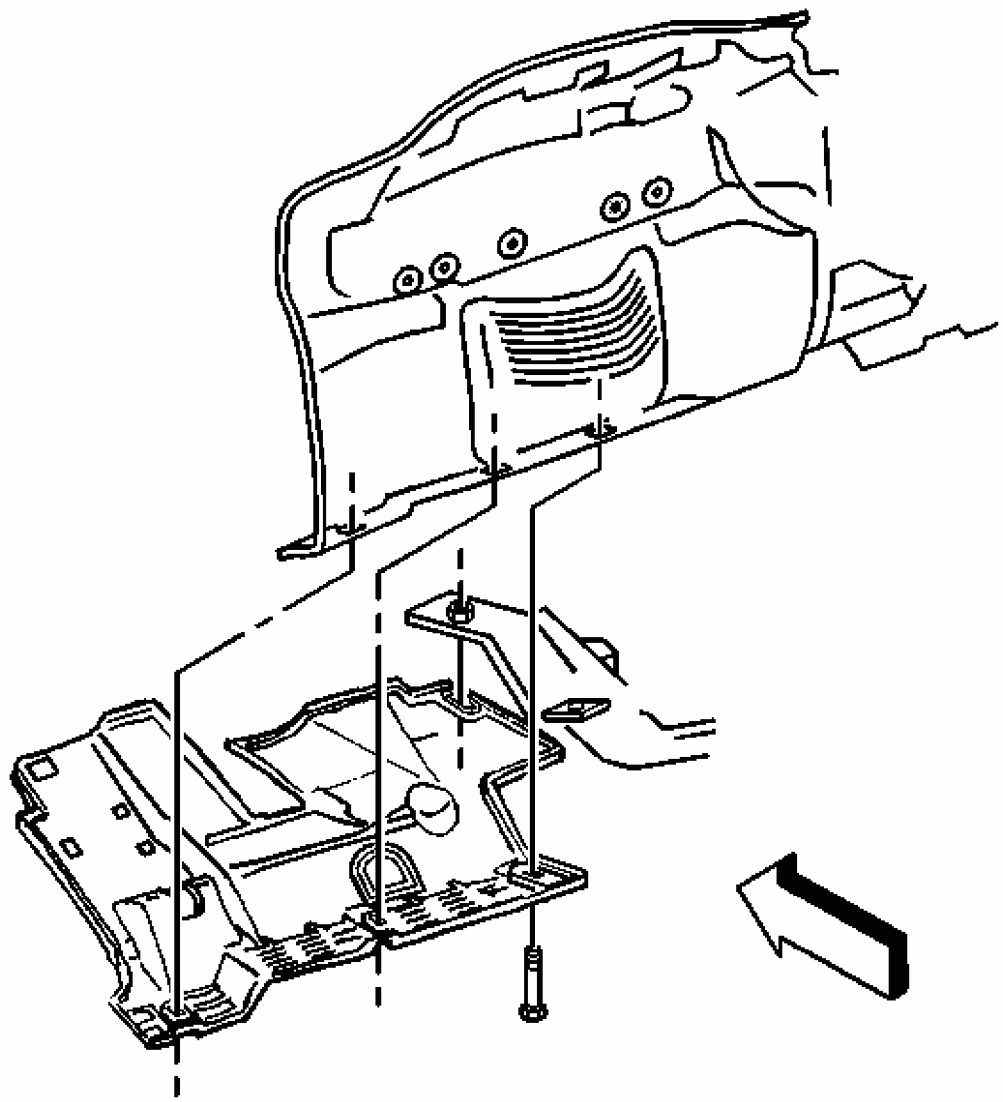


Fig. 22: View Of Instrument Panel Sound Insulator

Courtesy of GENERAL MOTORS CORP.

1. Install the remote control door lock receiver module to the instrument panel sound insulator.
2. Connect the electrical connector to the remote door lock receiver module.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the screw that retains the instrument panel sound insulator to the cowl panel.

   Tighten: Tighten the screw to 1.9 N.m (17 lb in).

4. Install the screws that retain the instrument panel sound insulator to the knee bolster.

   Tighten: Tighten the screws to 1.9 N.m (17 lb in).

5. Feed the DLC through the hole in the instrument panel sound insulator.
6. Install the screws that retain the DLC to the instrument panel sound insulator.

   Tighten: Tighten the screws to 2.4 N.m (21 lb in).

CLOSEOUT/INSULATOR PANEL REPLACEMENT - INSTRUMENT PANEL (I/P) LOWER

Removal Procedure

1. Remove the center console from the vehicle if equipped with RPO code YC7 (GMC Envoy). Refer to **Console Replacement - Front Floor (Full Length (Auto Trans))** , **Console Replacement - Front Floor (Full Length (Envoy))** , **Console Replacement - Front Floor (Non-Full Length)** or **Console Replacement - Front Floor (Full-Length (Manual Trans))** .

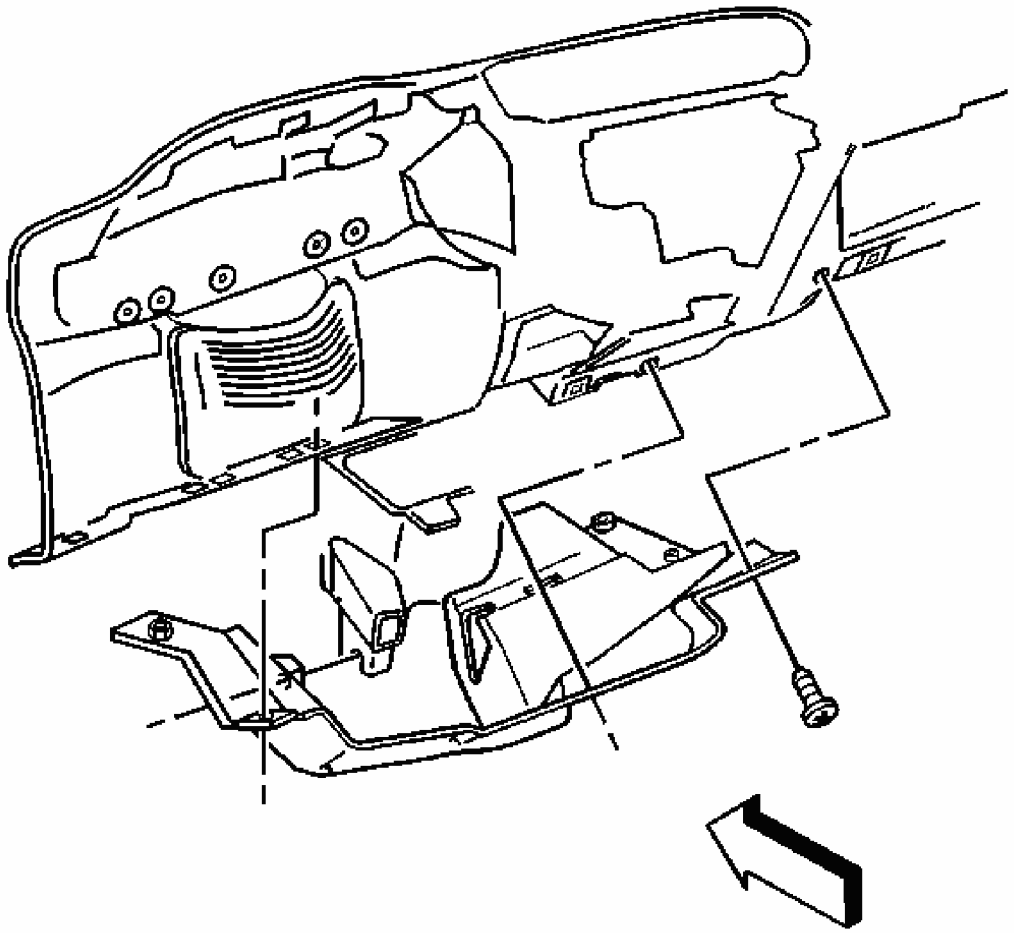


Fig. 23: View Of instrument Panel Sound Insulator
Courtesy of GENERAL MOTORS CORP.

2. Remove the screws that retain the instrument panel sound insulator to the following components:
   - The knee bolster
   - The instrument panel
   - The heater assembly
   - The floor duct
3. Remove the instrument panel sound insulator from the vehicle.
4. Disconnect the electrical connector from the accessory power outlet, if equipped.

Installation Procedure

1. Connect the electrical connector to the accessory power outlet, if equipped.

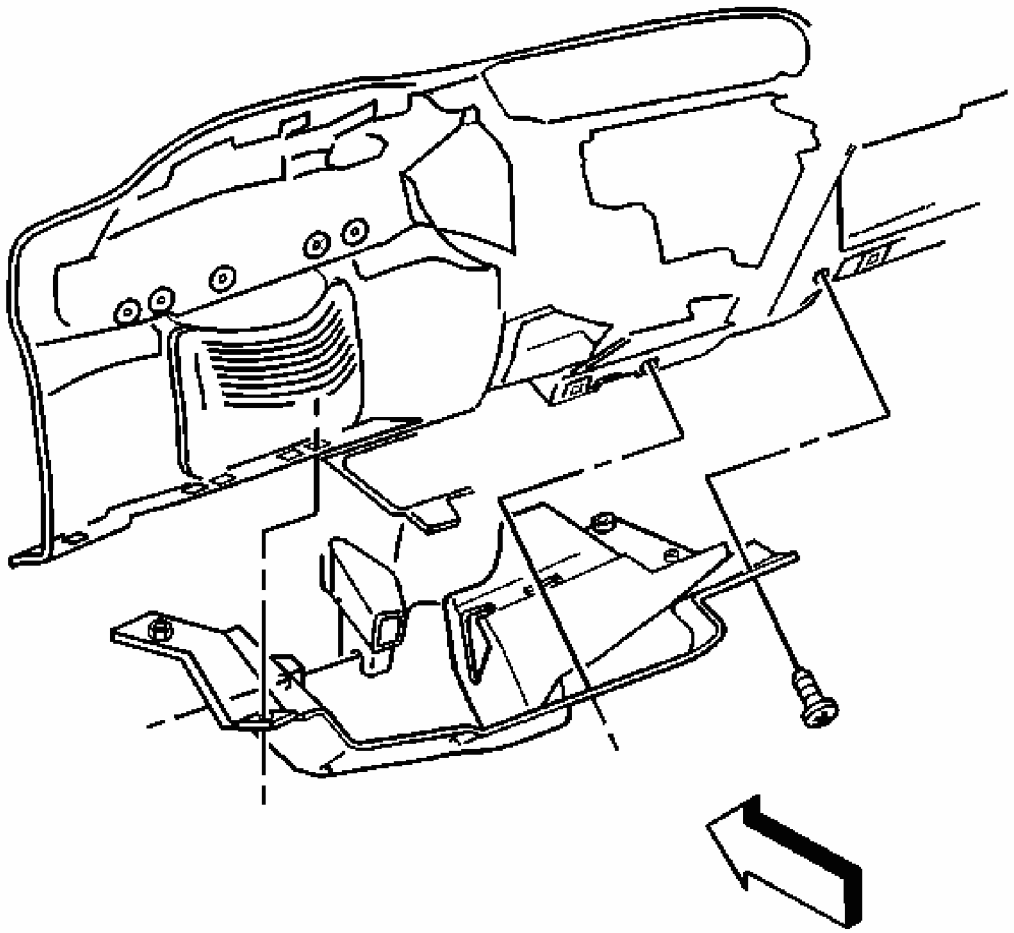


Fig. 24: View Of instrument Panel Sound Insulator
Courtesy of GENERAL MOTORS CORP.

2. Install the instrument panel sound insulator to the vehicle.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the screws that retain the instrument panel sound insulator to the following components:
   - The knee bolster
   - The instrument panel

- The floor duct

  Tighten: Tighten the screws to 1.5 N.m (13 lb in).

4. Install the screw that retains the instrument panel sound insulator to the heater assembly.

   Tighten: Tighten the screw to 1.5 N.m (13 lb in).

5. Install the center console to the vehicle if equipped with RPO code YC7 (GMC Envoy). Refer to **Console Replacement - Front Floor (Full Length (Auto Trans))** , **Console Replacement - Front Floor (Full Length (Envoy))** , **Console Replacement - Front Floor (Non-Full Length)** or **Console Replacement - Front Floor (Full-Length (Manual Trans))** .

TRIM PANEL REPLACEMENT - KNEE BOLSTER

Removal Procedure

1. Set the park brake.
2. Block the wheels.
3. Remove the left side instrument panel (I/P) sound insulator. Refer to **Closeout/Insulator Panel Replacement - Left** .
4. Remove the lower I/P sound insulator. Refer to **Closeout/Insulator Panel Replacement - Instrument Panel (I/P) Lower** .
5. Remove the park brake release cable from the park brake lever. Refer to **Park Brake Release Handle Assembly Replacement** in Park Brake.
6. Remove the screw that retains the courtesy lamp to the knee bolster. Refer to **Courtesy Lamp Replacement - Instrument Panel (Lower)** in Lighting Systems.

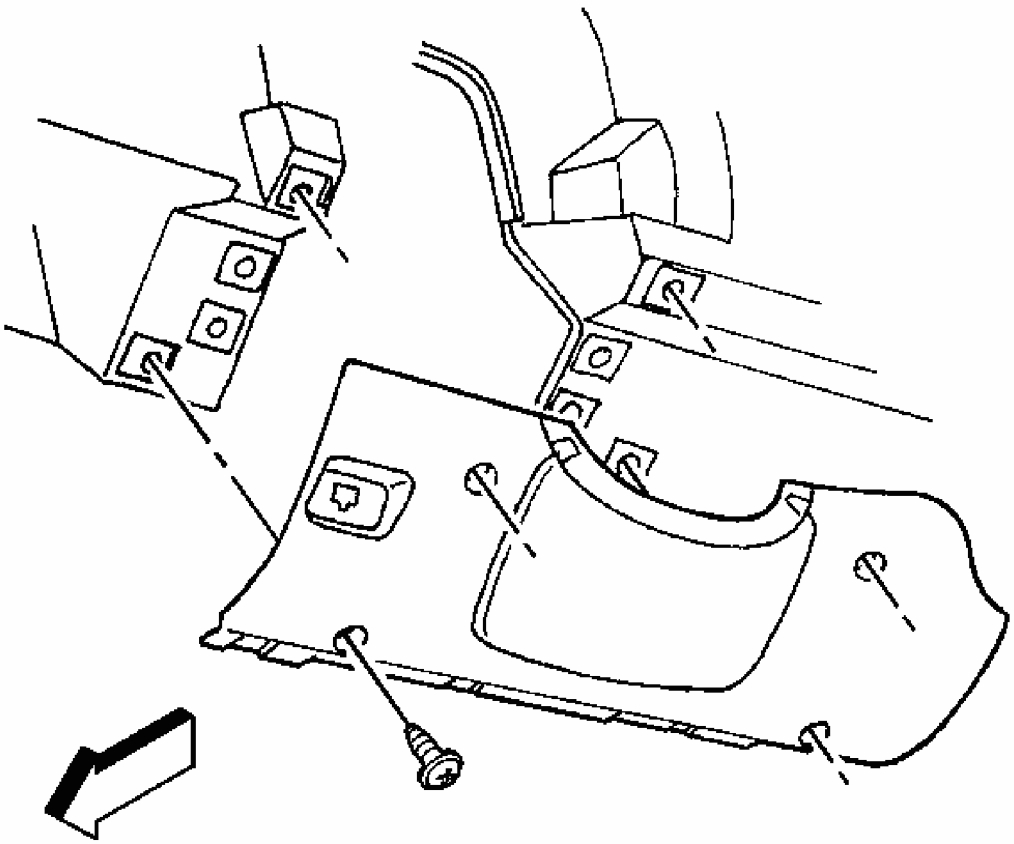


Fig. 25: View Of Knee Bolster Trim Panel
Courtesy of GENERAL MOTORS CORP.

7. Remove the screws that retain the knee bolster trim panel to the I/P.
8. Remove the knee bolster trim panel from the vehicle.

Installation Procedure

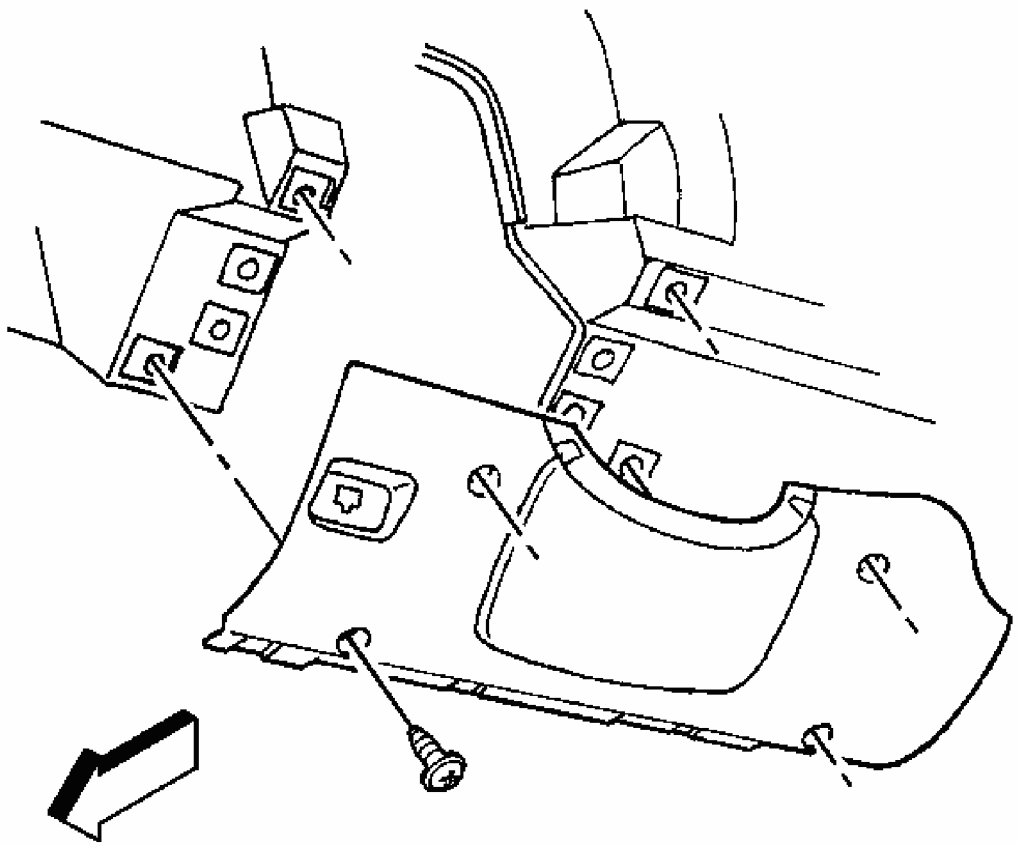


Fig. 26: View Of Knee Bolster Trim Panel
Courtesy of GENERAL MOTORS CORP.

1. Install the knee bolster trim panel to the vehicle.

   NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the screws that retain the knee bolster trim panel to the I/P.

   Tighten:

   - Tighten the TORX(R) screws to 9 N.m (80 lb in).
   - Tighten the hex head screws to 1.9 N.m (17 lb in).

3. Install the screw that retains the courtesy lamp to the knee bolster. Refer to **Courtesy Lamp Replacement - Instrument Panel (Lower)** in Lighting Systems.
4. Install the park brake release cable to the park brake lever. Refer to **Park Brake**

Release Handle Assembly Replacement in Park Brake.

5. Install the lower I/P sound insulator. Refer to **Closeout/Insulator Panel Replacement - Instrument Panel (I/P) Lower** .
6. Install the left side I/P sound insulator. Refer to **Closeout/Insulator Panel Replacement - Left** .

KNEE BOLSTER REPLACEMENT

Removal Procedure

1. Turn the ignition switch to the LOCK position.
2. Remove the left sound insulator. Refer to **Closeout/Insulator Panel Replacement - Left** .
3. Remove the knee bolster trim panel. Refer to **Trim Panel Replacement - Knee Bolster** .
4. Remove the instrument panel accessory trim plate. Refer to **Trim Plate Replacement - Instrument Panel (I/P) Accessory** .

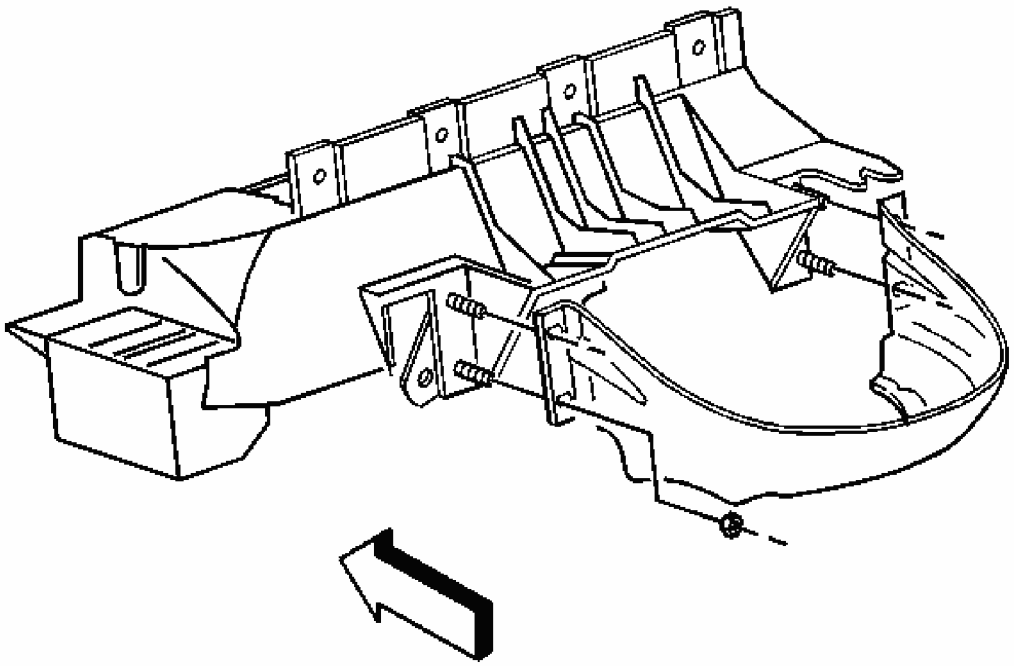


Fig. 27: View Of Knee Bolster
Courtesy of GENERAL MOTORS CORP.

5. Remove the nuts that retain the knee bolster from the steering column support

6. Remove the knee bolster from the studs.

Installation Procedure

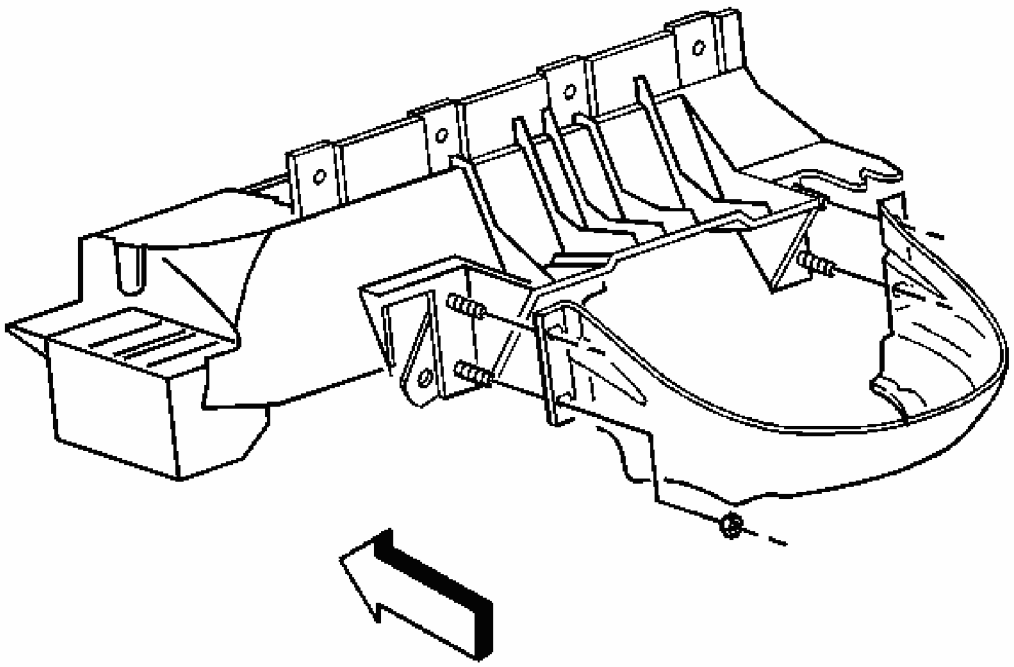


Fig. 28: View Of Knee Bolster
Courtesy of GENERAL MOTORS CORP.

1. Install the knee bolster to the studs.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the nuts that retain the knee bolster to the steering column support.

   Tighten: Tighten the nuts to 10 N.m (89 lb in).

3. Install the instrument panel accessory trim plate. Refer to **Trim Plate Replacement - Instrument Panel (I/P) Accessory** .
4. Install the knee bolster trim panel. Refer to **Trim Panel Replacement - Knee Bolster** .
5. Install the left sound insulator. Refer to **Closeout/Insulator Panel Replacement - Left** .

TRIM PLATE REPLACEMENT - INSTRUMENT PANEL (I/P) ACCESSORY

Removal Procedure

1. Remove the left instrument panel sound insulator. Refer to **Closeout/Insulator Panel Replacement - Left** .
2. Remove the knee bolster trim panel. Refer to **Trim Panel Replacement - Knee Bolster** .

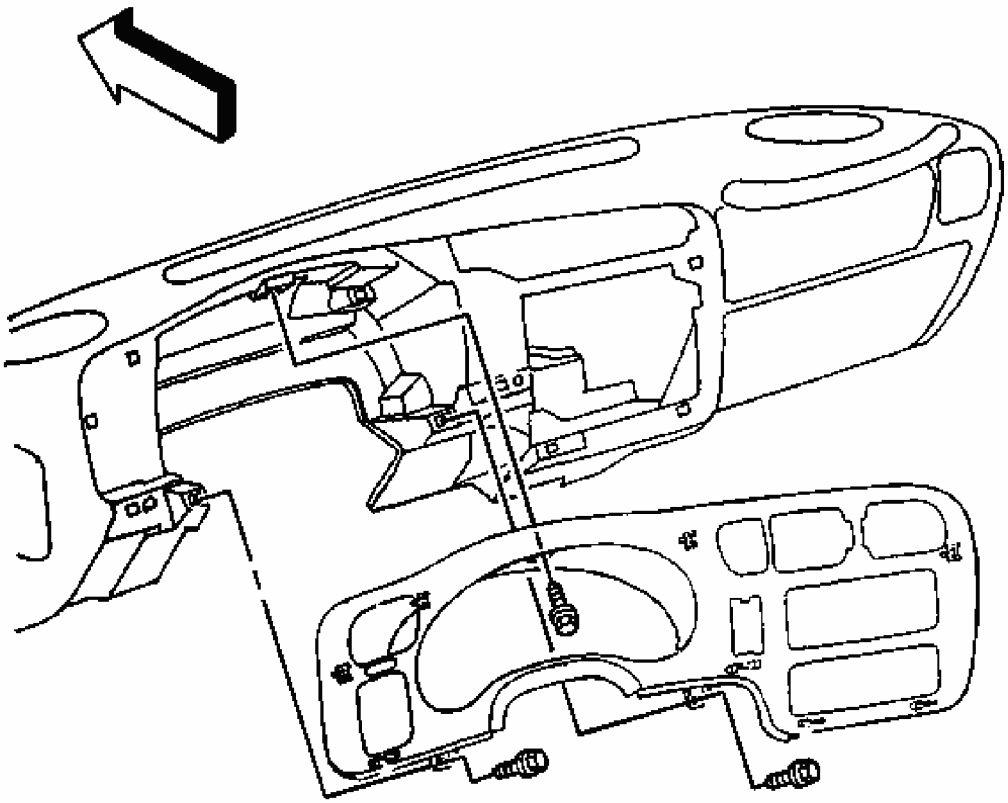


Fig. 29: View Of Instrument Panel Trim Plate
Courtesy of GENERAL MOTORS CORP.

3. Remove the screws that retain the instrument panel accessory trim plate to the instrument panel.
4. Remove the instrument panel accessory trim plate by releasing the retaining clips.
5. Position the instrument panel accessory trim plate in order to remove the control switches.
    - Remove the selectable 4WD switch, if equipped. Refer to **Transfer Case Shift**

Control Switch Replacement or **Transfer Case Shift Control Switch Replacement** in Transfer Case.

- Remove the inflatable restraint IP module switch. Refer to **Inflatable Restraint Instrument Panel (I/P) Module Disable Switch Replacement** in SIR.
- Remove the headlamp switch. Refer to **Headlamp Switch Replacement** in Lighting Systems.

Installation Procedure

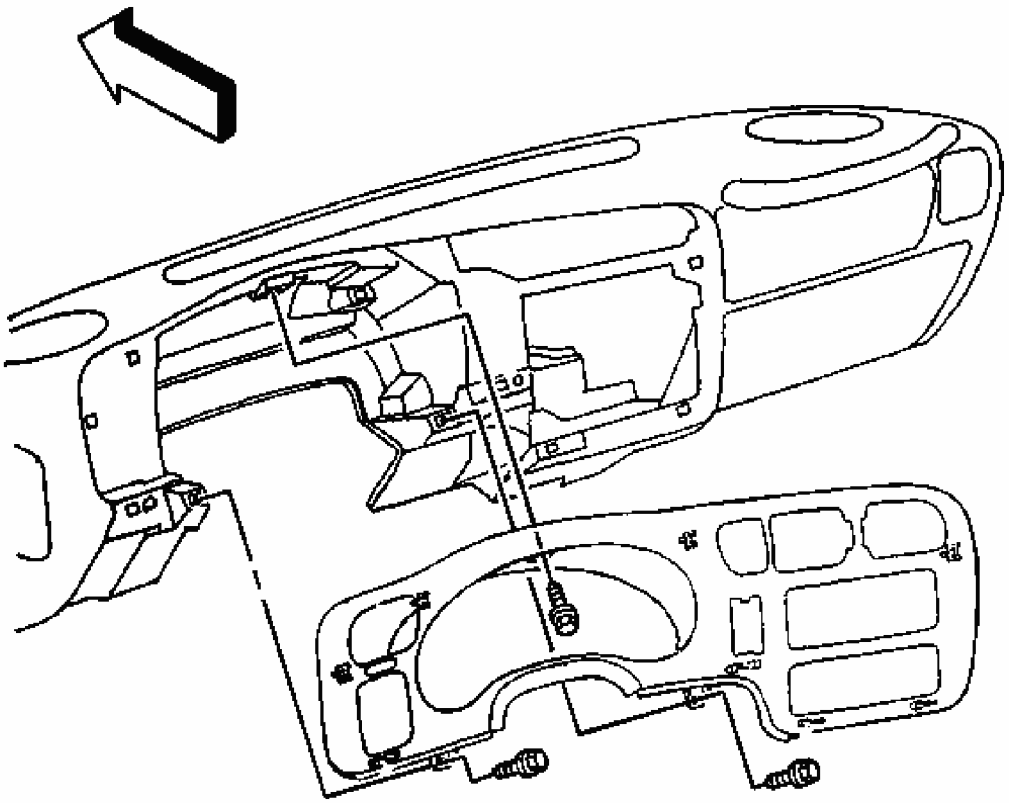


Fig. 30: View Of Instrument Panel Trim Plate
Courtesy of GENERAL MOTORS CORP.

1. Position the instrument panel accessory trim plate in order to install the control switches.
   - Install the selectable 4WD switch, if equipped. Refer to **Transfer Case Shift Control Switch Replacement** or **Transfer Case Shift Control Switch Replacement** in Transfer Case.
   - Install the inflatable restraint IP module switch. Refer to **Inflatable Restraint**

Instrument Panel (I/P) Module Disable Switch Replacement in SIR.

- Install the headlamp switch. Refer to **Headlamp Switch Replacement** in Lighting Systems.

2. Install the instrument panel accessory trim plate clips to the instrument panel.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the screws that retain the instrument panel accessory trim plate to the instrument panel.

   Tighten: Tighten the screws to 1.9 N.m (17 lb in).

4. Install the knee bolster trim panel. Refer to **Trim Panel Replacement - Knee Bolster** .
5. Install the left instrument panel sound insulator. Refer to **Closeout/Insulator Panel Replacement - Left** .

DOOR REPLACEMENT - INSTRUMENT PANEL (I/P) COMPARTMENT

Removal Procedure

1. Remove the right side instrument panel sound insulator. Refer to **Closeout/Insulator Panel Replacement - Right** .

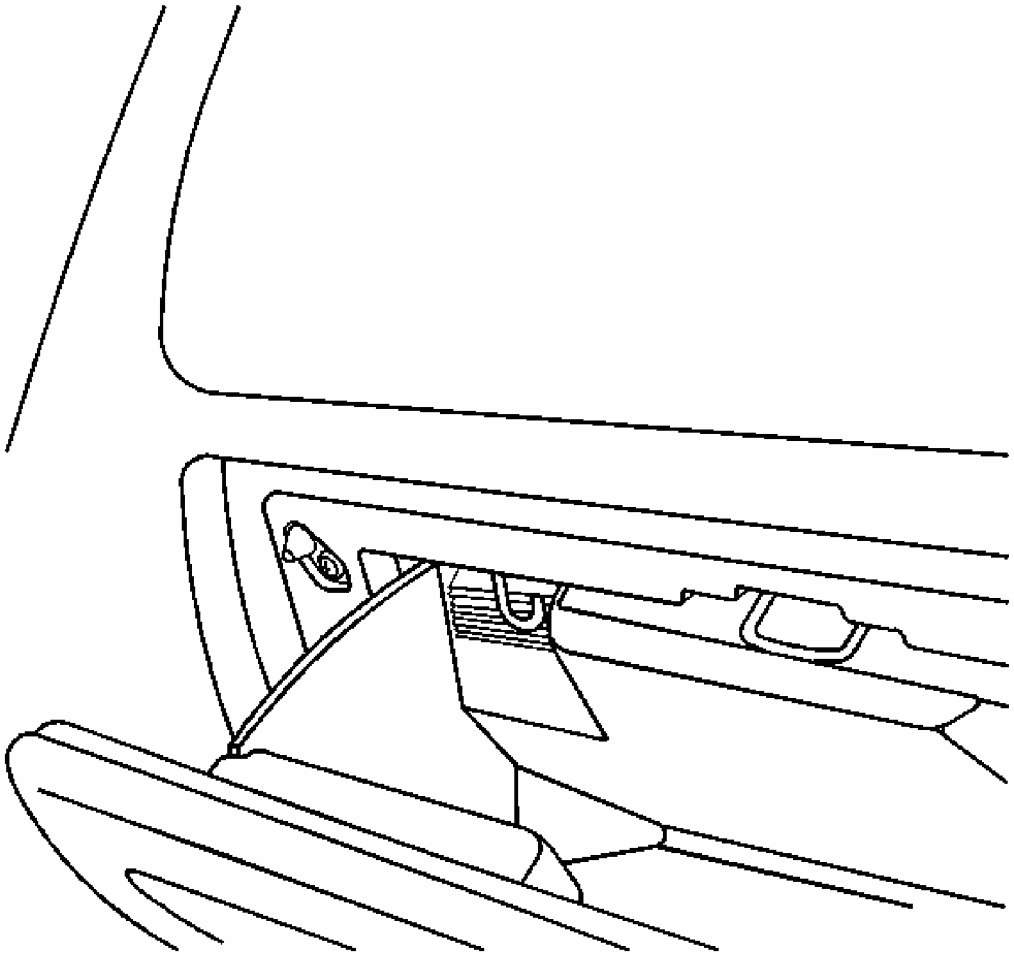


Fig. 31: View Of Instrument Panel Compartment Door
Courtesy of GENERAL MOTORS CORP.

2. Push up on the J-spring in order to release the storage compartment door.

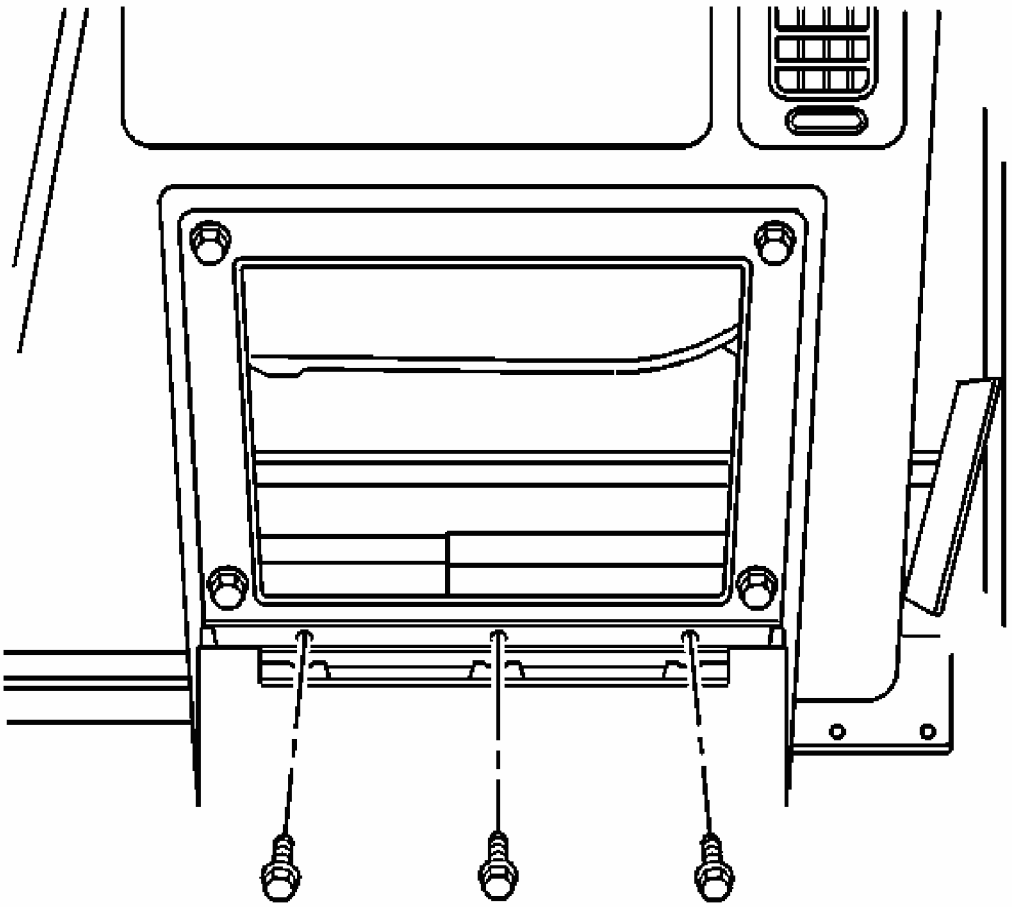


Fig. 32: View Of Instrument Panel Compartment Door Hinges
Courtesy of GENERAL MOTORS CORP.

3. Remove the screws that retain the instrument panel compartment door hinges to the instrument panel.
4. Remove the instrument panel storage compartment door from the instrument panel.

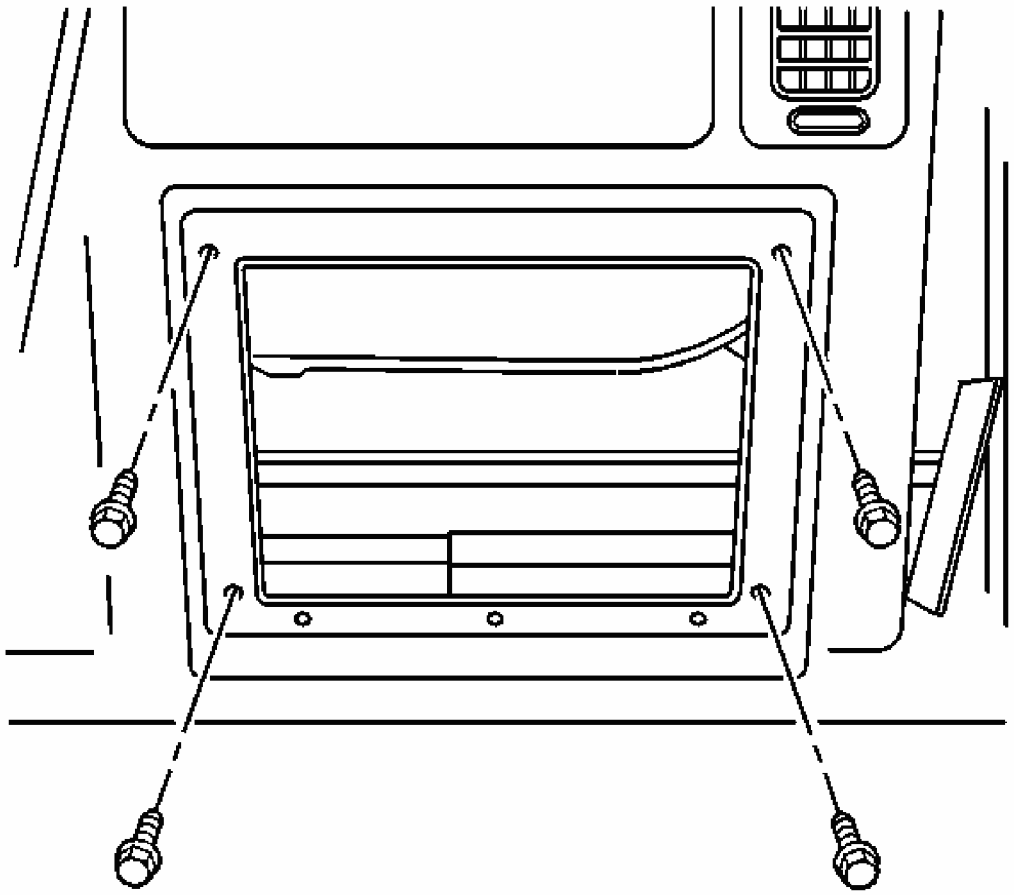


Fig. 33: View Of Instrument Panel Compartment Bezel
Courtesy of GENERAL MOTORS CORP.

5. Remove the screws that retain the instrument panel compartment bezel to the instrument panel.
6. Remove the instrument panel compartment bezel from the instrument panel.
7. Disconnect the electrical connector from the instrument panel compartment lamp and switch assembly.

Installation Procedure

1. Connect the electrical connector to the instrument panel compartment lamp and switch assembly.

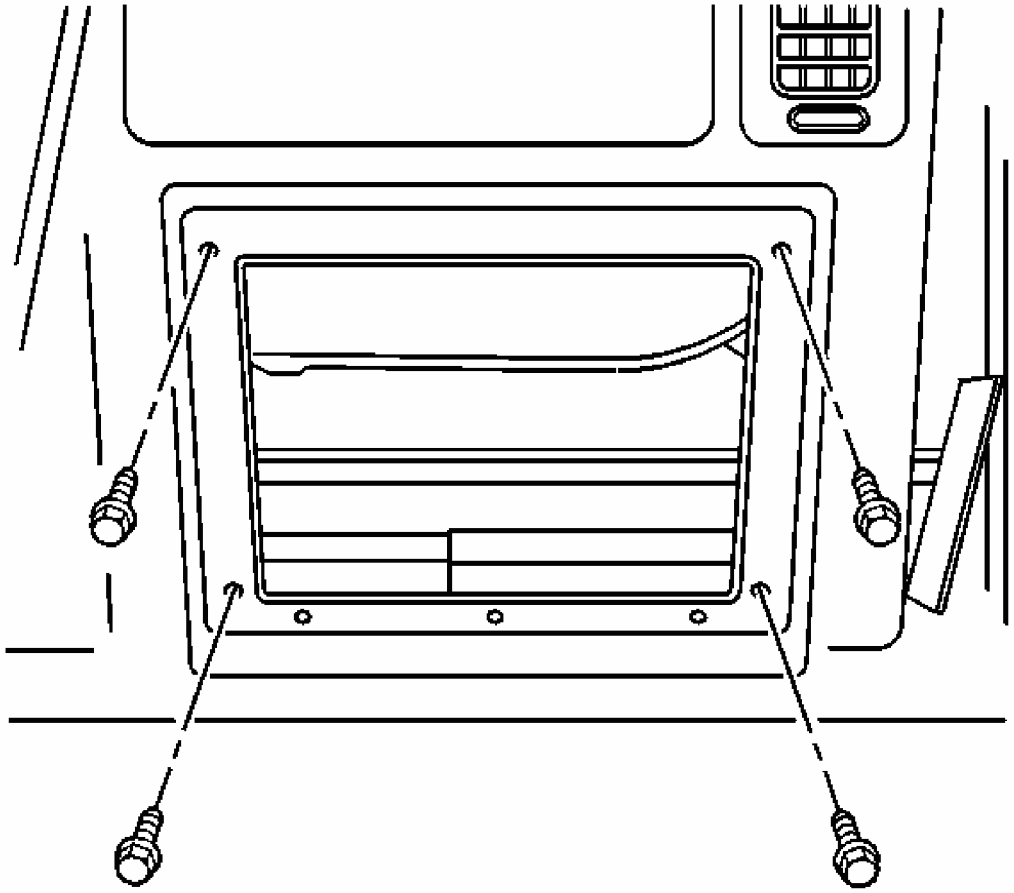


Fig. 34: View Of Instrument Panel Compartment Bezel
Courtesy of GENERAL MOTORS CORP.

2. Install the storage compartment bezel to the instrument panel.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the screws that retain the instrument panel compartment bezel to the instrument panel.

Tighten: Tighten the screws to 1.9 N.m (17 lb in).

4. Install the instrument panel storage compartment door to the instrument panel.

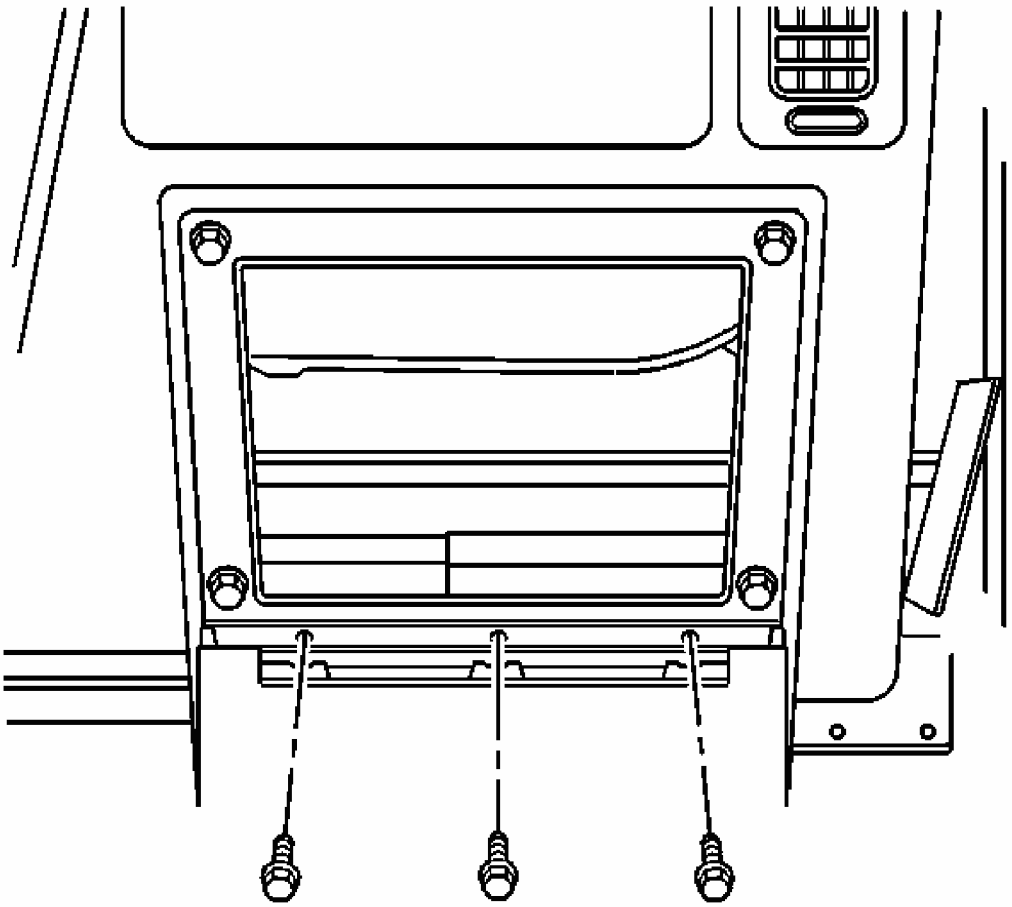


Fig. 35: View Of Instrument Panel Compartment Door Hinges
Courtesy of GENERAL MOTORS CORP.

5. Install the screws that retain the instrument panel compartment door hinges to the instrument panel.

   Tighten: Tighten the screws to 1.9 N.m (17 lb in).

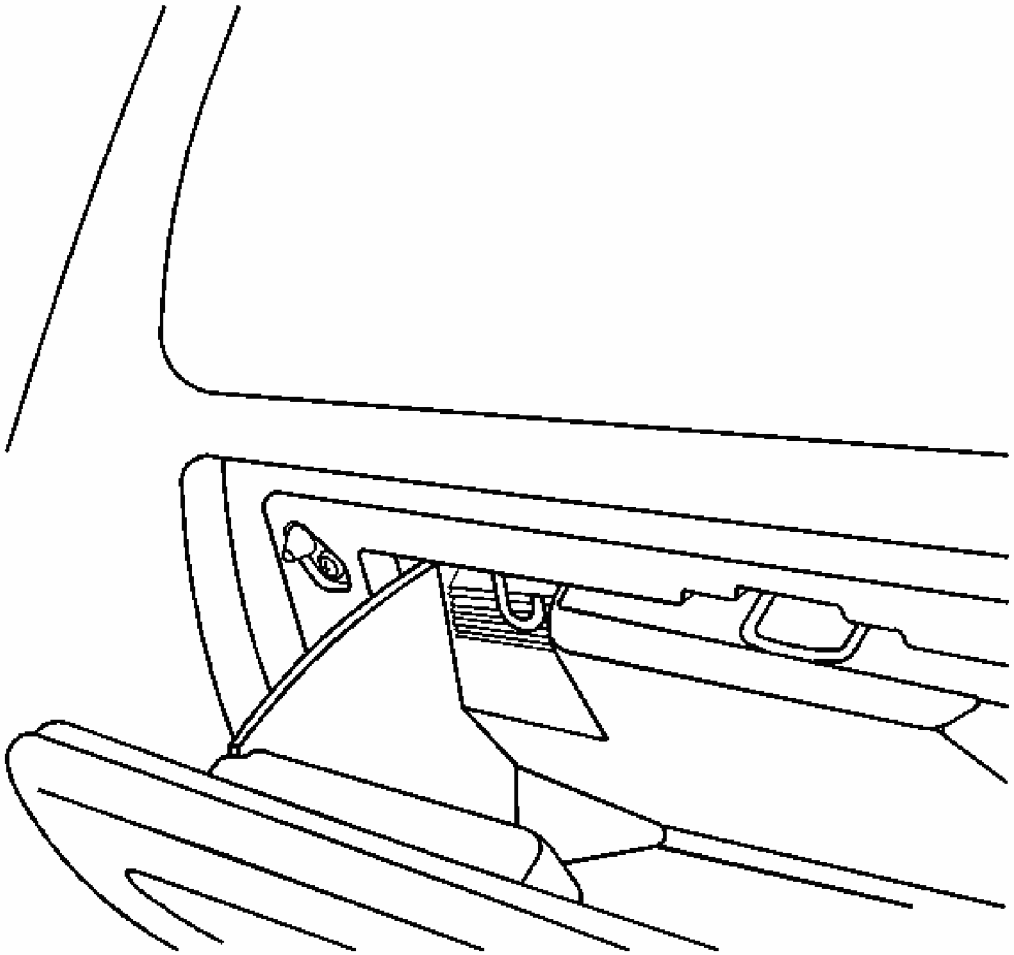


Fig. 36: View Of Instrument Panel Compartment Door
Courtesy of GENERAL MOTORS CORP.

6. Push the storage compartment into place.
7. Install the right side instrument panel sound insulator. Refer to **Closeout/Insulator Panel Replacement - Right** .

BRACKET REPLACEMENT - STEERING COLUMN

Removal Procedure

IMPORTANT: The steering column support is not serviceable.

1. Remove the instrument panel. Refer to **Instrument Panel (I/P) Carrier**

Replacement .

2. Remove the brake switch. Refer to **Stop Lamp Switch Replacement** in Hydraulic Brakes.
3. Remove the brake booster pushrod from the brake pedal. Refer to **Vacuum Brake Booster Replacement** in Hydraulic Brakes.
4. Remove the clutch master cylinder pushrod from the clutch pedal, if equipped. Refer to **Clutch Pedal Replacement** in Clutch.

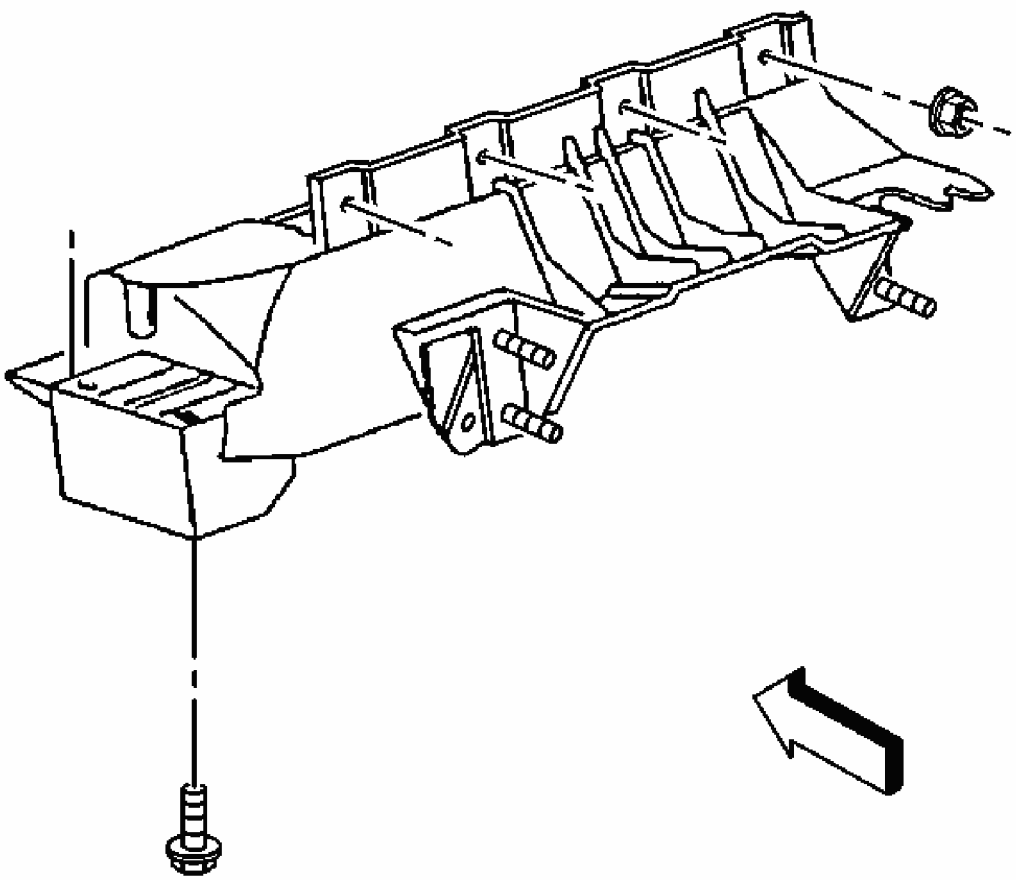


Fig. 37: View Of Steering Column Bracket
Courtesy of GENERAL MOTORS CORP.

5. Remove the following steering column support fasteners:
   - The 4 flange nuts
   - The 2 bolts
6. Remove the brake pedal from the steering column support. Refer to **Brake Pedal Assembly Replacement** in Hydraulic Brakes.

Installation Procedure

1. Install the brake pedal to the steering column support. Refer to **Brake Pedal Assembly Replacement** in Hydraulic Brakes.

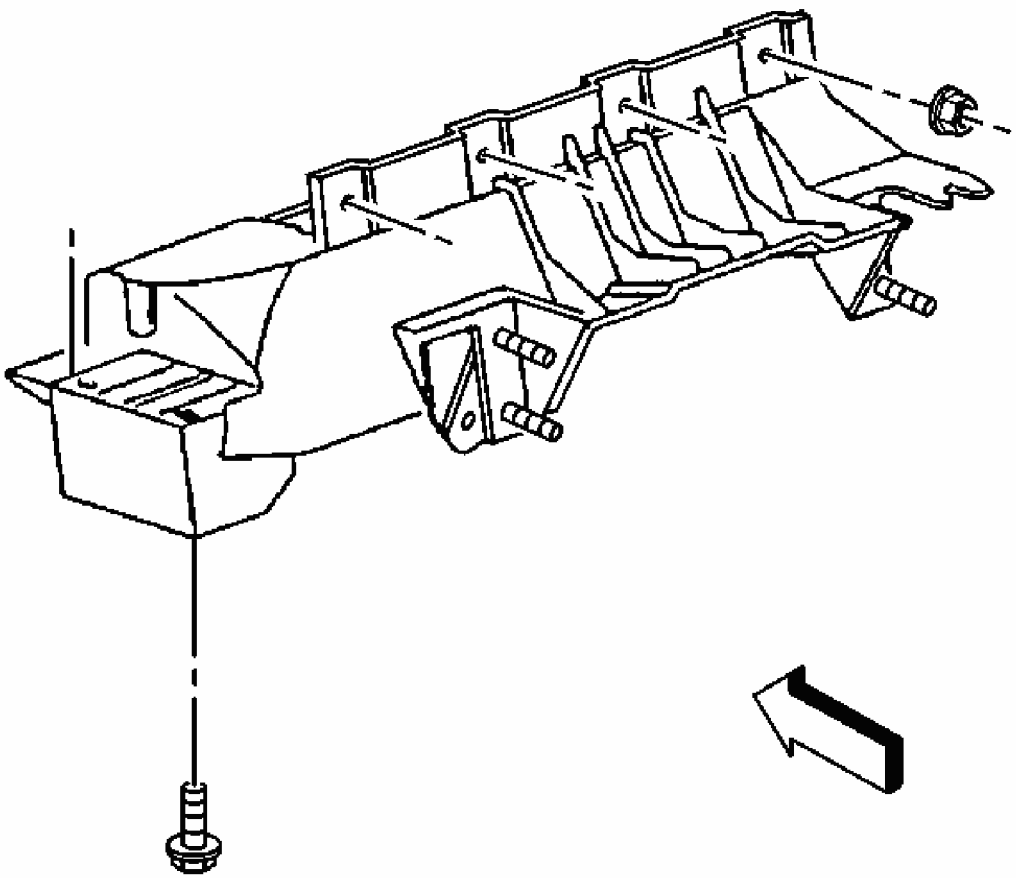


Fig. 38: View Of Steering Column Bracket
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the steering column support bracket fasteners.

Tighten:

- Tighten the nuts to 25 N.m (18 lb ft).
- Tighten the bolts to 25 N.m (18 lb ft).

3. Install the brake switch. Refer to **Stop Lamp Switch Replacement** in Hydraulic Brakes.
4. Install the brake booster pushrod to the brake pedal. Refer to **Vacuum Brake Booster Replacement** in Hydraulic Brakes.
5. Install the clutch master cylinder pushrod to the clutch pedal, if equipped. Refer to **Clutch Pedal Replacement** in Clutch.
6. Install the instrument panel. Refer to **Instrument Panel (I/P) Carrier Replacement** .

DRIVER INFORMATION CENTER REPLACEMENT (WITHOUT SUNROOF)

Removal Procedure

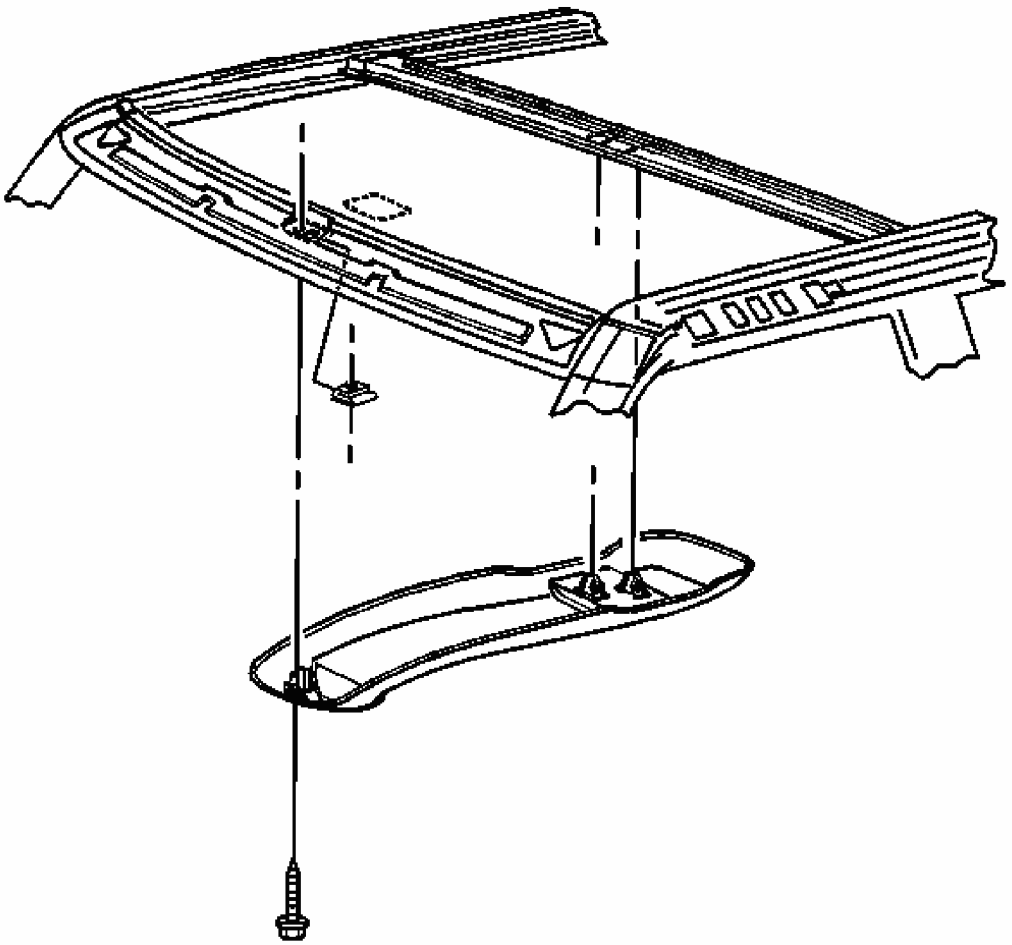


Fig. 39: View Of Console
Courtesy of GENERAL MOTORS CORP.

1. Remove the screw at the front of the console that retains the console to the roof.
2. Pull downward at the rear of the console in order to remove the console from the roof.
3. Disconnect the electrical connections as needed.

Installation Procedure

1. Connect the electrical connections as needed.

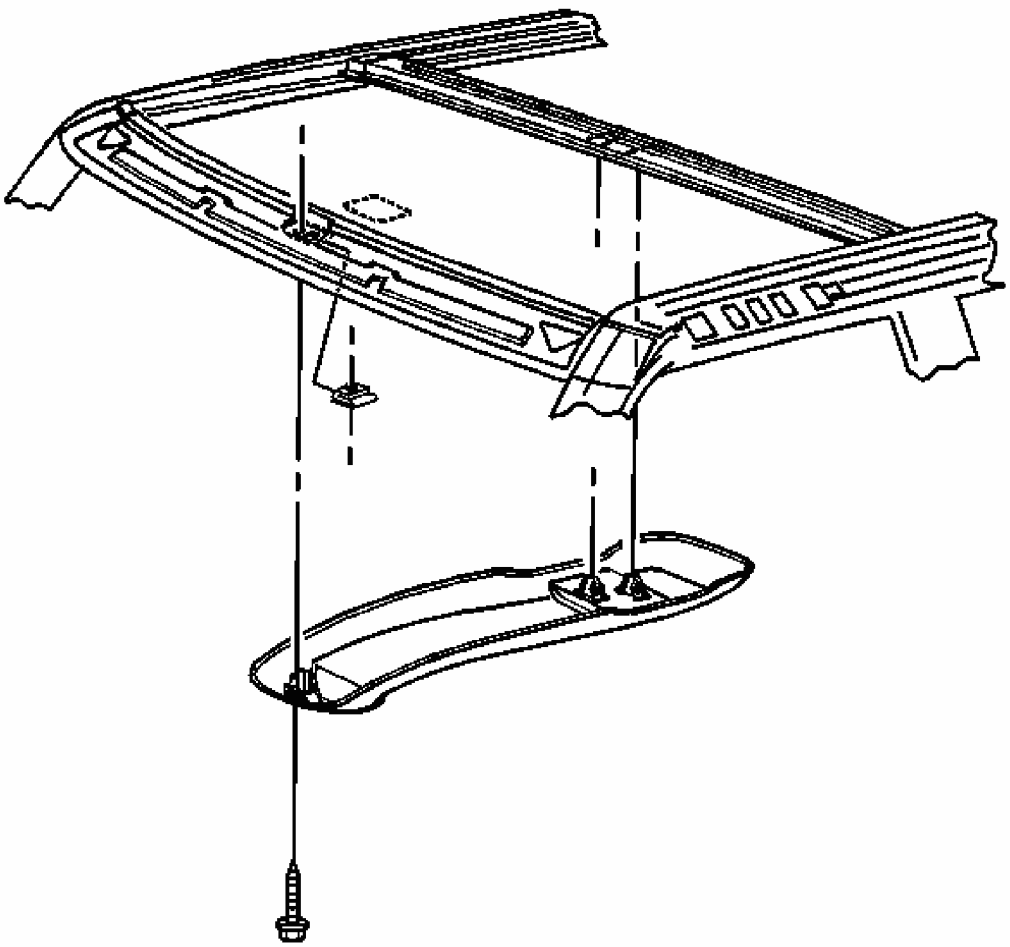


Fig. 40: View Of Console
Courtesy of GENERAL MOTORS CORP.

2. Insert the mounting tabs into the roof panel and push upward on the rear of the console in order to install the console to the roof.

NOTE: Refer to Fastener Notice in Cautions and

Notices.

3. Install the screw at the front of the console that retains the console to the roof.

   Tighten: Tighten the screw to 1.9 N.m (17 lb in).

DRIVER INFORMATION CENTER REPLACEMENT (WITH SUNROOF)

Removal Procedure

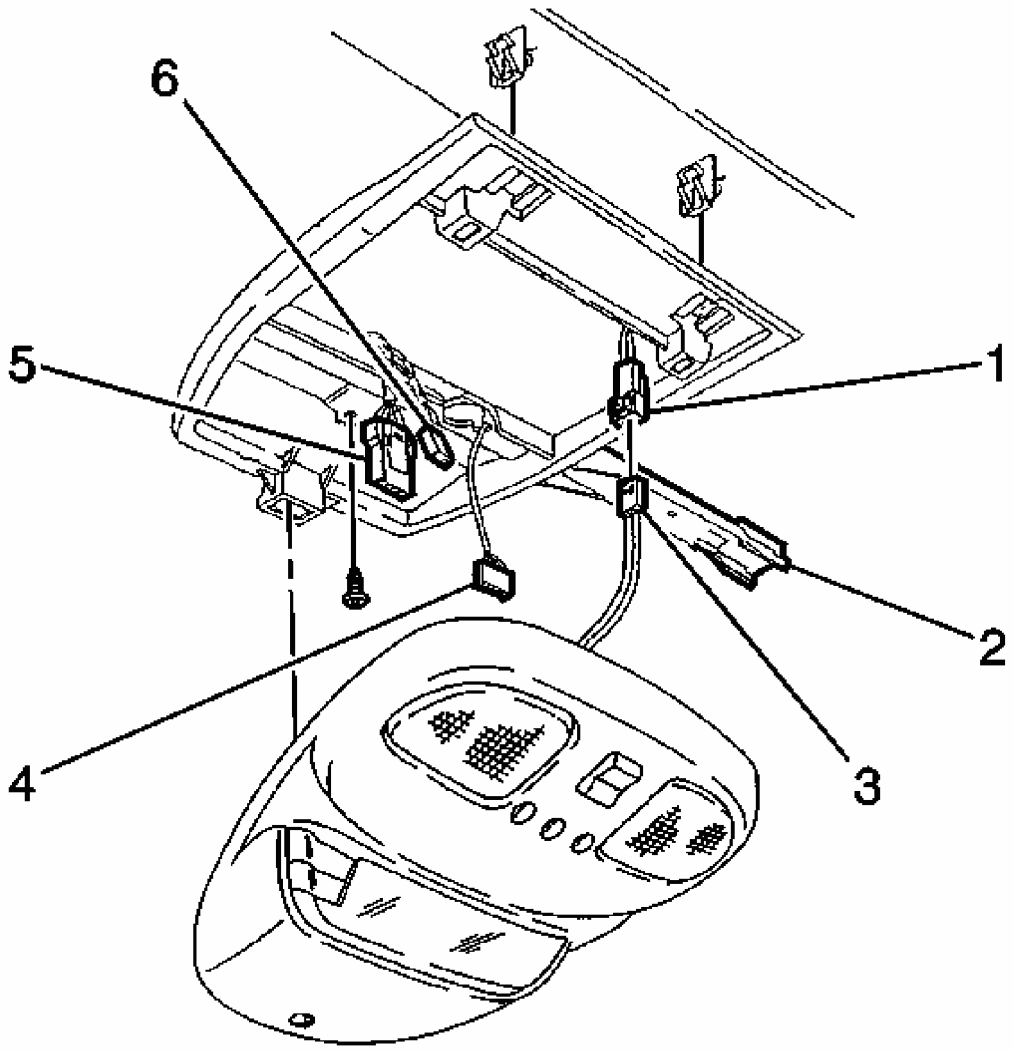


Fig. 41: Locating Sunroof Console Components
Courtesy of GENERAL MOTORS CORP.

1. Remove the screw at the front of the console that retains the sunroof console to the roof.
2. Pull downward on the rear of the console in order to remove the sunroof console from the roof.
3. Disconnect the electrical connectors (1, 5, 6) as needed.
4. Remove the screw that retains the sunroof console mounting bracket to the roof.

Installation Procedure

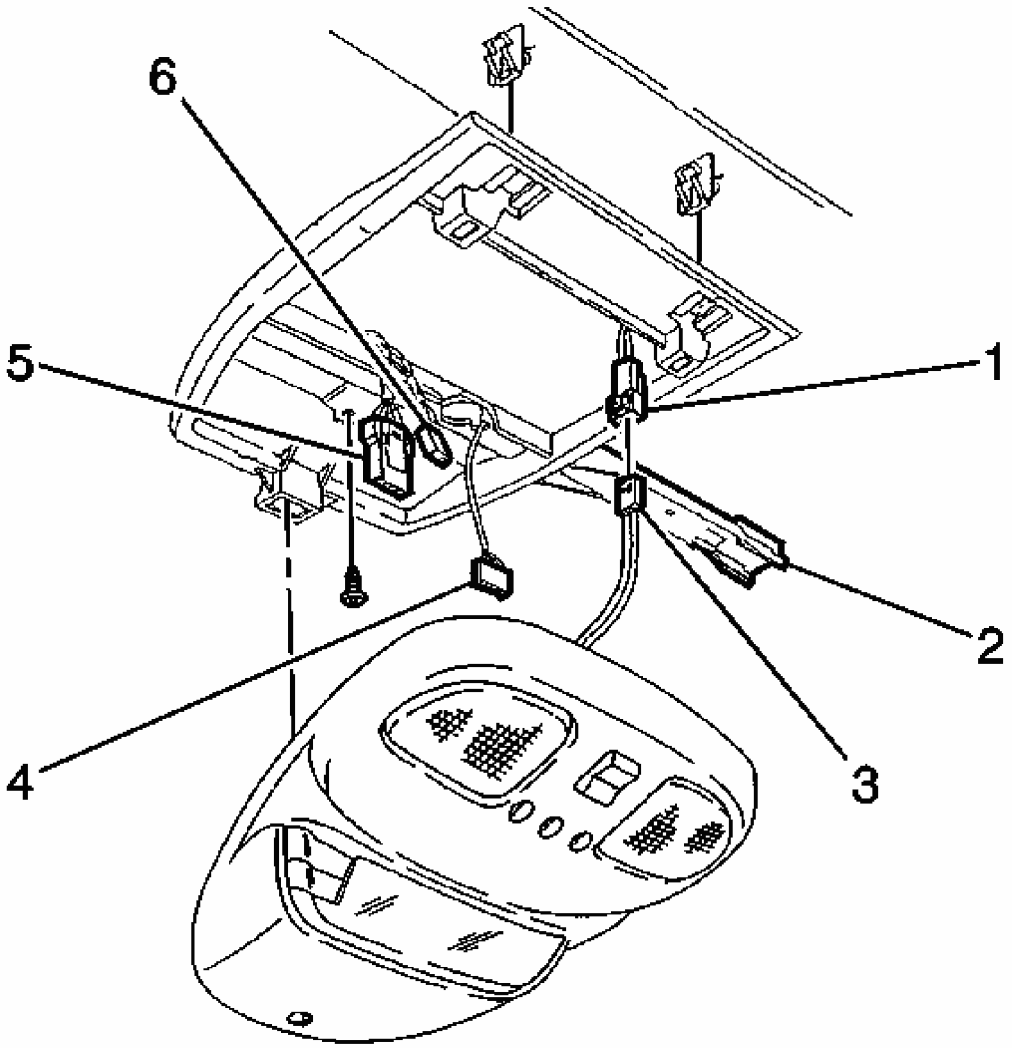


Fig. 42: Locating Sunroof Console Components
Courtesy of GENERAL MOTORS CORP.

1. Install the electrical connectors (1, 5, 6) as needed.
2. Insert the console mounting tabs into the mounting bracket and push upward on the rear of the console in order to install the console.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the screw at the front of the console that retains the console to the roof.

Tighten: Tighten the screw to 1.9 N.m (17 lb in).

DRIVER INFORMATION CENTER MODULE REPLACEMENT

Removal Procedure

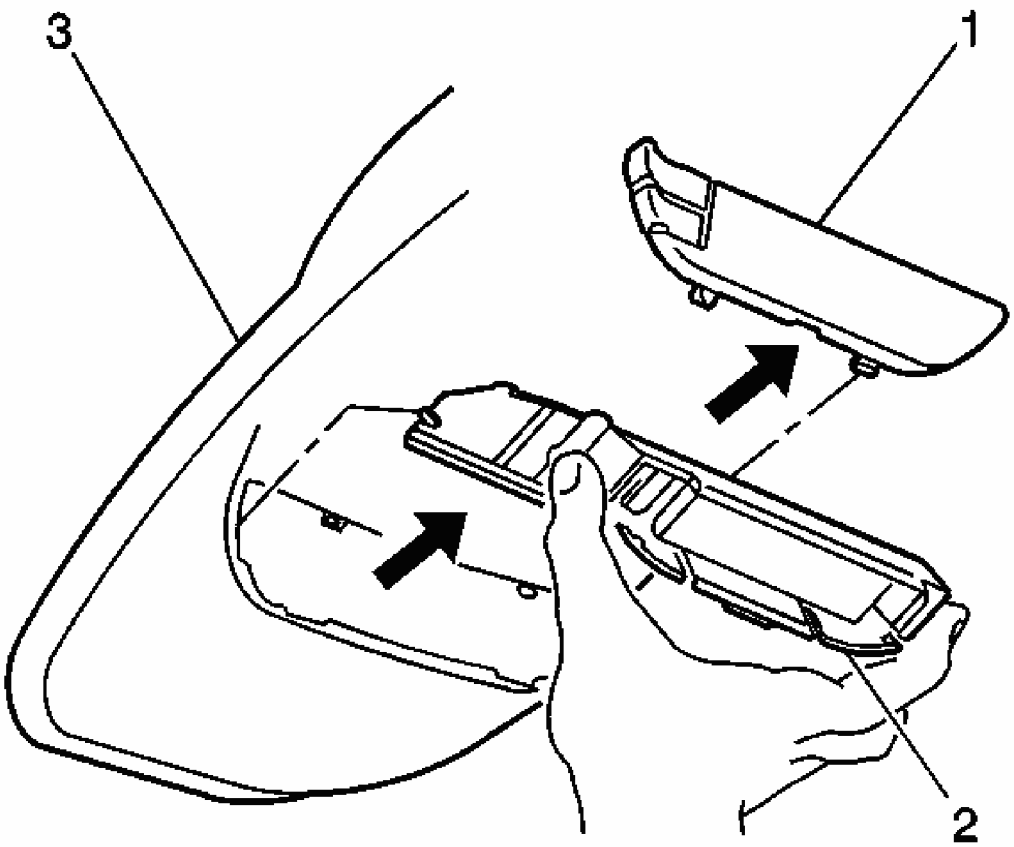


Fig. 43: Locating Overhead Console Components
Courtesy of GENERAL MOTORS CORP.

1. Using a flat-bladed tool, carefully remove the display lens (1) from the overhead console (3).
2. Remove the electronic display module (2) from the console (3).
3. Disconnect the electrical connection.

Installation Procedure

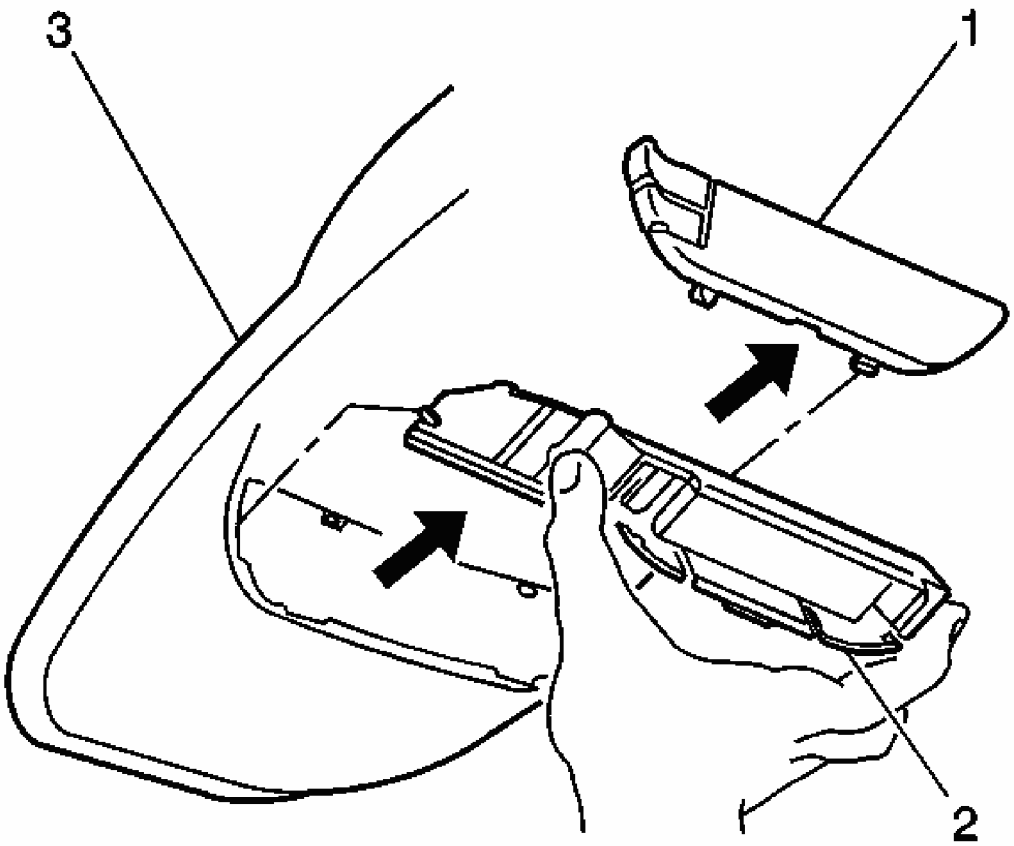


Fig. 44: Locating Overhead Console Components
Courtesy of GENERAL MOTORS CORP.

1. Connect the electrical connection.
2. Install the electronic display module (2) to the overhead console (3).
3. Install the display lens (1) by snapping the lens into place.
4. Calibrate the compass. Refer to **Electronic Compass Calibration** .

INSTRUMENT PANEL CLUSTER (IPC) REPLACEMENT

Removal Procedure

1. Remove the instrument panel accessory trim plate. Refer to **Trim Plate Replacement - Instrument Panel (I/P) Accessory** .

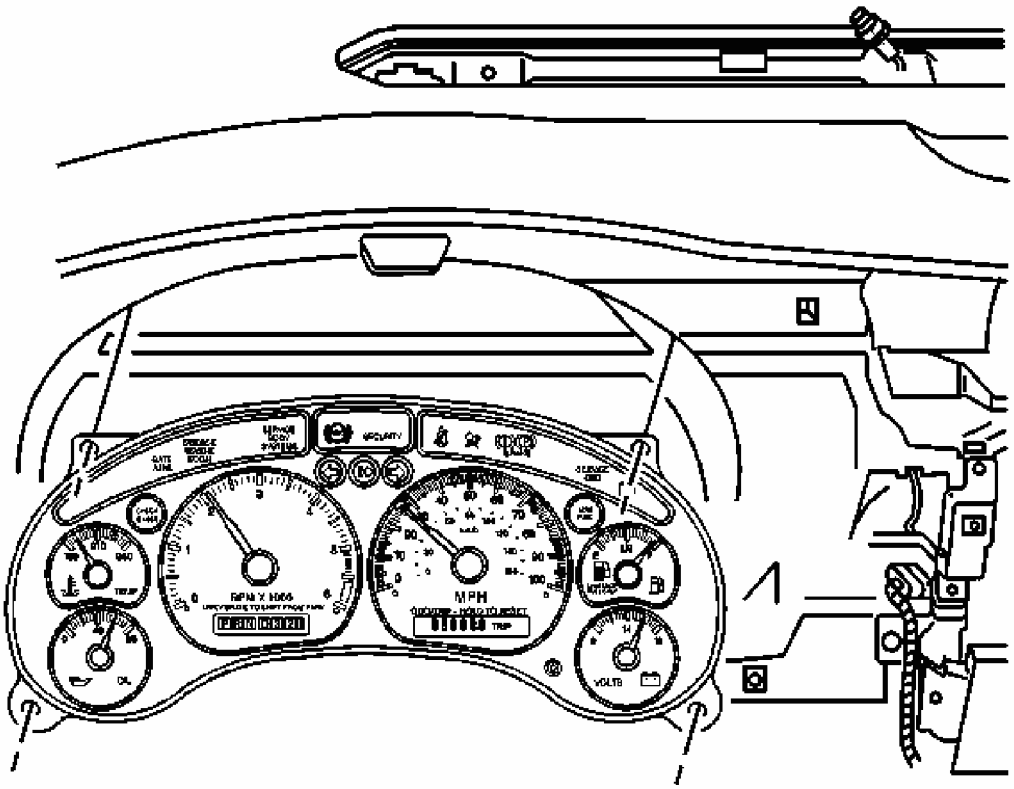


Fig. 45: View Of Instrument Panel Cluster
Courtesy of GENERAL MOTORS CORP.

2. Remove the screws from the instrument panel cluster.
3. Disconnect the electrical connector from the instrument panel cluster.
4. Remove the instrument panel cluster from the instrument panel.

Installation Procedure

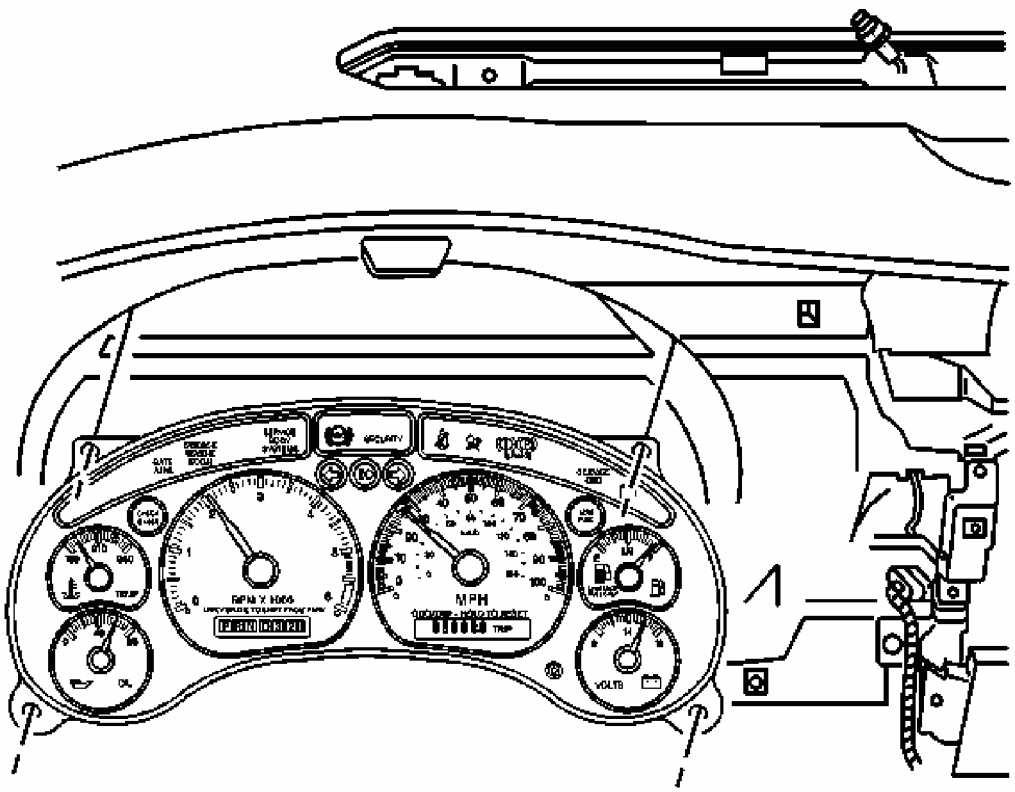


Fig. 46: View Of Instrument Panel Cluster
Courtesy of GENERAL MOTORS CORP.

1. Install the instrument panel cluster to the instrument panel.
2. Connect the electrical connector to the instrument panel cluster.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the screws to instrument panel cluster.

   Tighten: Tighten the screws to 1.9 N.m (17 lb in).

4. Install the instrument panel accessory trim plate. Refer to **Trim Plate Replacement - Instrument Panel (I/P) Accessory** .

INSTRUMENT PANEL CLUSTER (IPC) LENS REPLACEMENT

Removal Procedure

1. Remove the instrument panel cluster. Refer to **Instrument Panel Cluster (IPC) Replacement** .

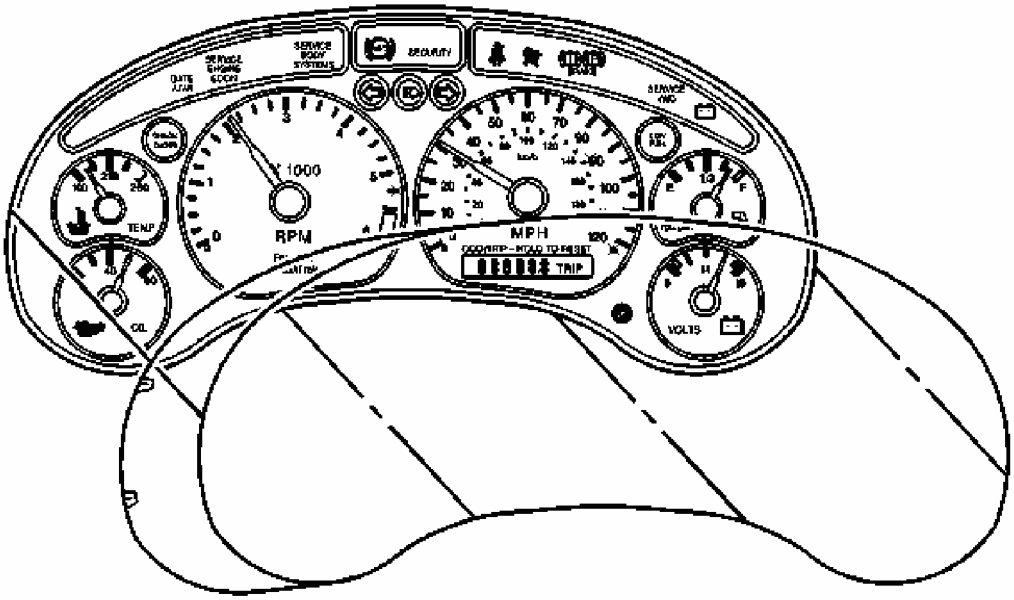


Fig. 47: View Of Instrument Panel Cluster Lens
Courtesy of GENERAL MOTORS CORP.

2. Gently pry the lens retaining tabs away from the cluster housing.
3. Remove the lens from the cluster housing.

Installation Procedure

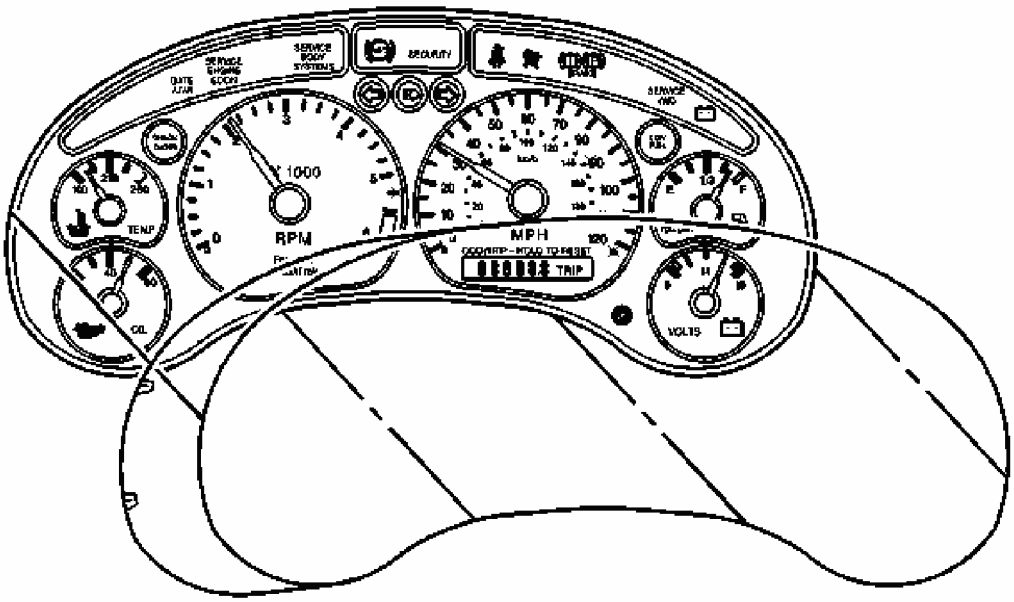


Fig. 48: View Of Instrument Panel Cluster Lens
Courtesy of GENERAL MOTORS CORP.

1. Install the lens to the cluster housing by snapping it into place.
2. Install the instrument panel cluster. Refer to **Instrument Panel Cluster (IPC) Replacement** .

ASHTRAY REPLACEMENT

Removal Procedure

1. Remove the instrument panel trimplate. Refer to **Trim Plate Replacement - Instrument Panel (I/P) Accessory** .

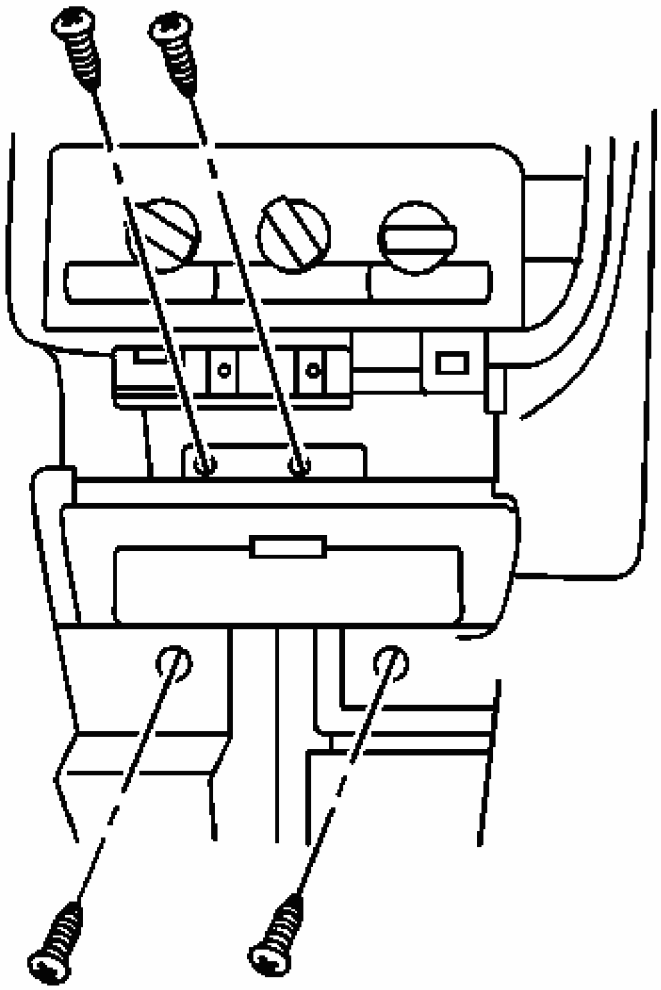


Fig. 49: View Of Ashtray Housing
Courtesy of GENERAL MOTORS CORP.

2. Remove ashtray housing retaining screws.
3. Move the ashtray housing rearward in order to disconnect the electrical connectors.
4. Remove the clip that retains the electrical connectors to the instrument panel.
5. Disconnect the electrical connectors.
6. Remove the ashtray housing from the instrument panel.

Installation Procedure

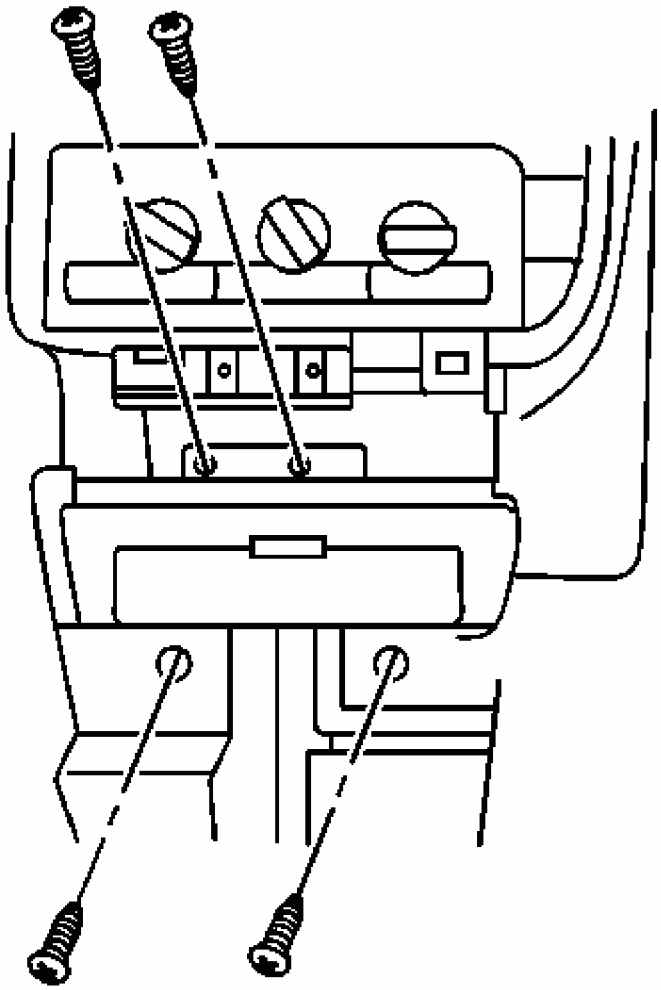


Fig. 50: View Of Ashtray Housing
Courtesy of GENERAL MOTORS CORP.

1. Install the ashtray housing to the instrument panel.
2. Position the ashtray housing in order to connect the electrical connectors.
3. Connect the electrical connectors.
4. Install the electrical connector retaining clip to the instrument panel.

NOTE: Refer to Fastener Notice in Cautions and Notices.

5. Install the screws that retain the ash tray housing to the instrument panel.

Tighten: Tighten the screws to 1.9 N.m (17 lb in).

6. Install the instrument panel trimplate. Refer to **Trim Plate Replacement - Instrument Panel (I/P) Accessory** .

INSTRUMENT PANEL (I/P) CARRIER REPLACEMENT

Removal Procedure

1. On vehicles equipped with a manual transmission, remove the shift lever. Refer to **Shift Tower Replacement** in Manual Transmission - NV 3500.
2. On vehicles equipped with an automatic transmission, perform the following steps:
   A. Apply the park brake.
   B. Insert the ignition key and turn the ignition switch to the RUN position.
   C. Depress the brake pedal and shift the transmission to the 1 position.
   D. Turn the ignition switch to the OFF position.

CAUTION: Refer to Battery Disconnect Caution in Cautions and Notices.

3. Disconnect the battery negative cable.

CAUTION: Refer to SIR Caution in Cautions and Notices.

4. Disable the passenger side SIR system. Refer to **SIR Disabling and Enabling Zone 3** and **SIR Disabling and Enabling Zone 5** in SIR.
5. Remove the left sound insulator. Refer to **Closeout/Insulator Panel Replacement - Left** .
6. Remove the right instrument panel sound insulator. Refer to **Closeout/Insulator Panel Replacement - Right** .
7. If the vehicle is equipped with a multiple CD changer located in the center console, remove the center console. Refer to **Console Replacement - Front Floor (Full Length (Auto Trans))** , **Console Replacement - Front Floor (Full Length (Envoy))** , **Console Replacement - Front Floor (Non-Full Length)** or **Console Replacement - Front Floor (Full-Length (Manual Trans))** .
8. Remove the lower sound insulator. Refer to **Closeout/Insulator Panel Replacement - Instrument Panel (I/P) Lower** .

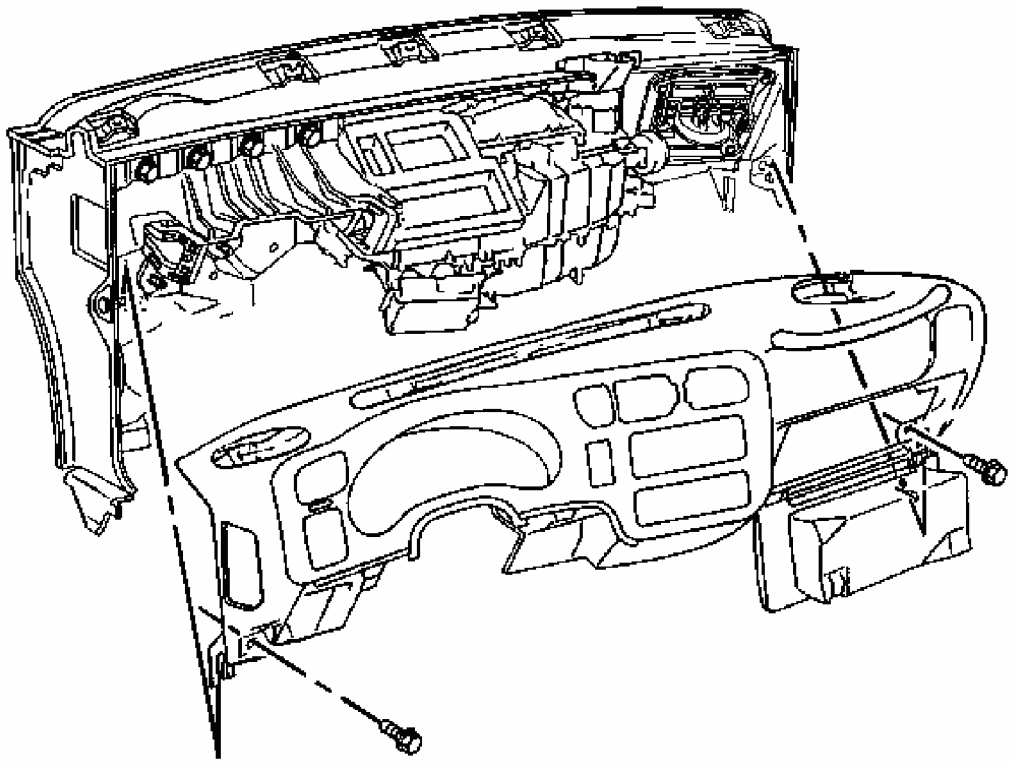


Fig. 51: View Of Instrument Panel Carrier
Courtesy of GENERAL MOTORS CORP.

9. Remove the lower left instrument panel mounting bolt.
10. Remove and retain the instrument panel storage compartment. Refer to **Door Replacement - Instrument Panel (I/P) Compartment** .
11. Remove the lower right instrument panel mounting bolt.
12. Remove and retain the left and right speakers and the speaker grilles. Refer to **Speaker Replacement - Front** in Entertainment.

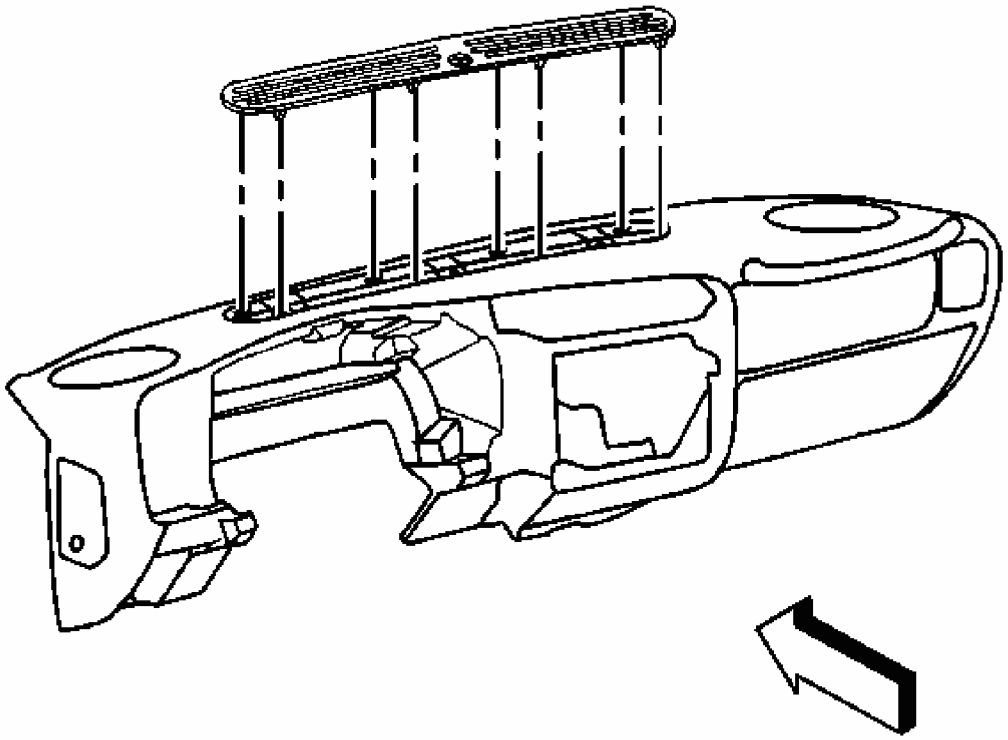


Fig. 52: View Of Windshield Defroster Grille
Courtesy of GENERAL MOTORS CORP.

13. Use a flat-bladed tool to remove the windshield defroster grille. Retain the windshield defroster grille for use on the replacement I/P carrier.

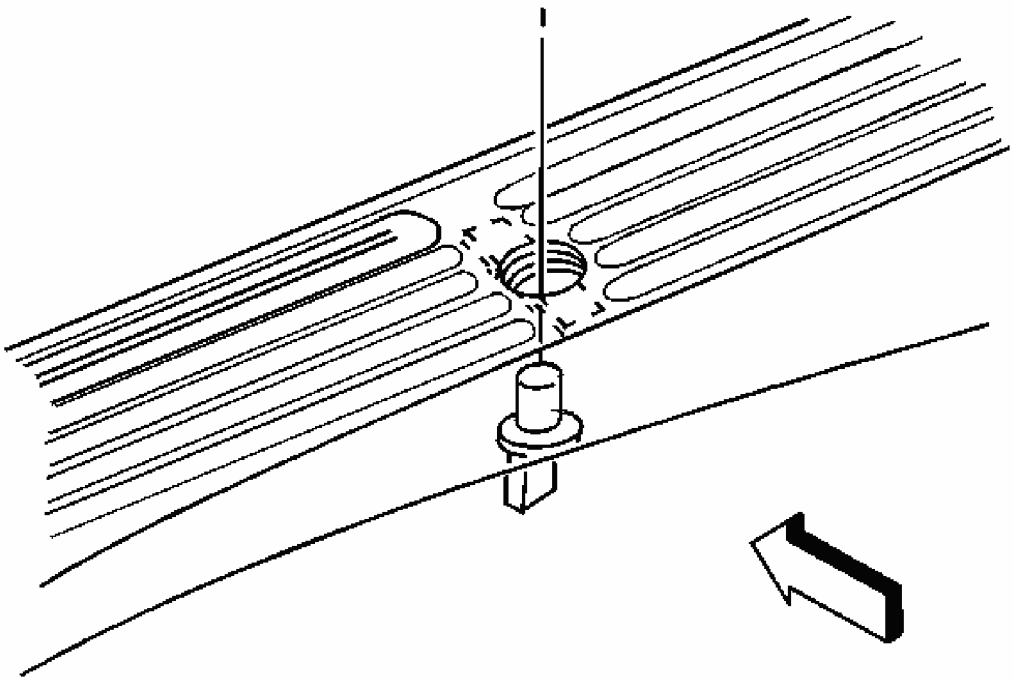


Fig. 53: View Of Sunload Sensor
Courtesy of GENERAL MOTORS CORP.

14. If the vehicle is equipped with a sunload sensor, twist the sunload sensor 1/4 turn counterclockwise in order to detach it from the windshield defroster grille. Retain the sunload sensor for use on the replacement I/P carrier.

IMPORTANT: Always disconnect the brown electrical connector from the body control module (BCM) before disconnecting the purple electrical connector from the BCM.

15. Disconnect the brown electrical connector from the BCM.
16. Disconnect the purple electrical connector from the BCM.
17. Remove the knee bolster. Refer to **Knee Bolster Replacement** .
18. Remove and retain the instrument panel cluster. Refer to **Instrument Panel Cluster (IPC) Replacement** .
19. Remove and retain the radio. Refer to **Radio Replacement (RPO Code UM6, UM7)** or **Radio Replacement (RPO Code UC6)** in Entertainment.
20. Remove and retain the HVAC control assembly. Refer to **HVAC Control Assembly Replacement** in HVAC Systems - Manual.

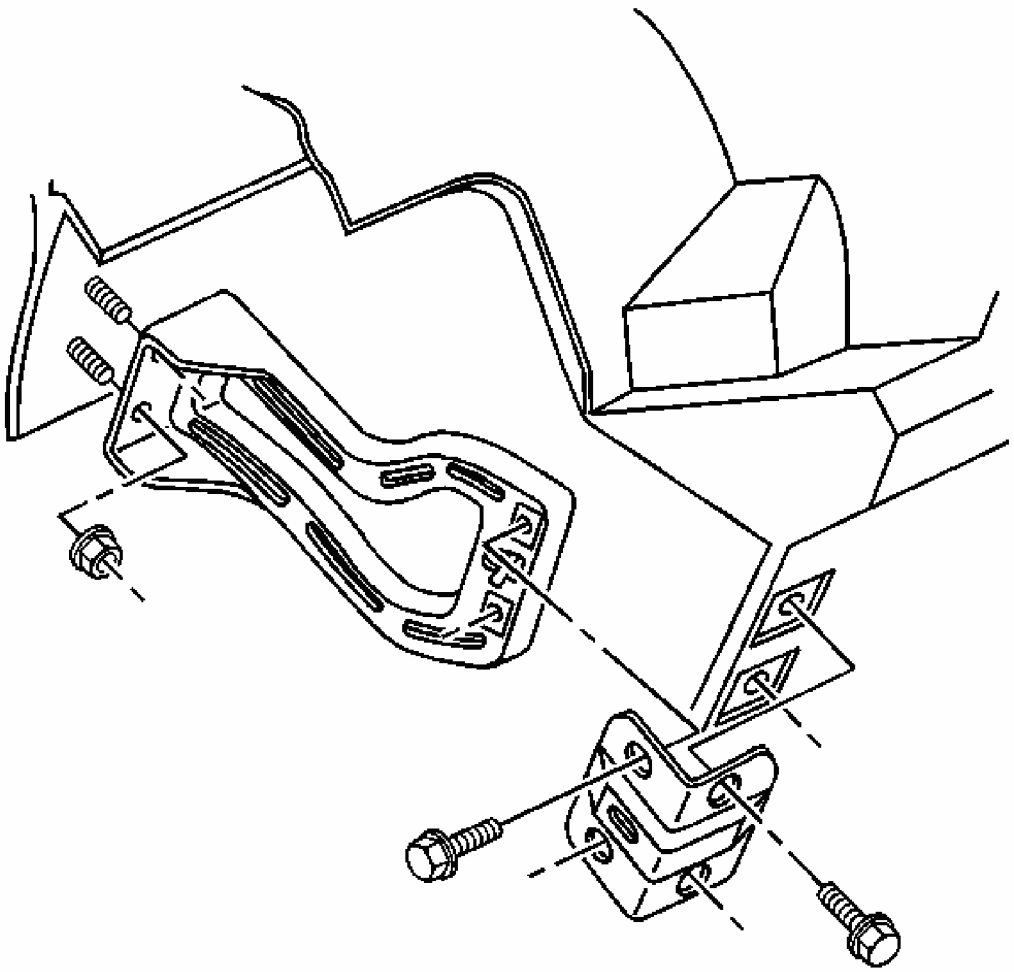


Fig. 54: View Of Knee Bolster Bracket
Courtesy of GENERAL MOTORS CORP.

21. Remove the left and right instrument panel driver knee bolster brackets.
22. Lower the steering column for clearance. Refer to **Steering Column Replacement** in Steering Wheel and Column.

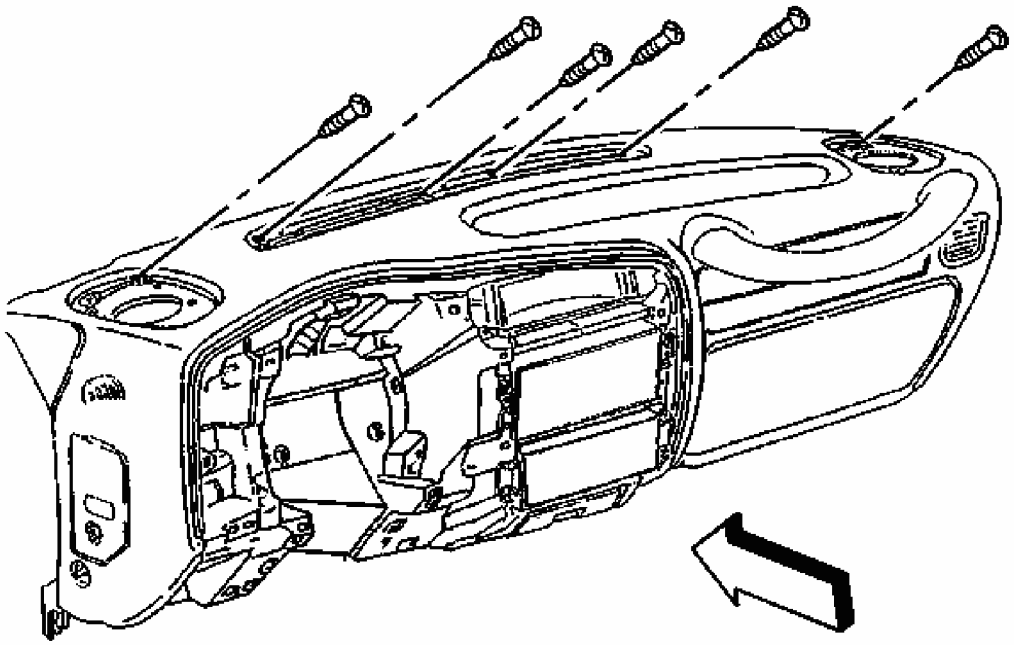


Fig. 55: Locating Top Instrument Panel Screws
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Label all of the connections in order to avoid improper installation.

23. Remove the top instrument panel screws.
24. Roll the instrument panel down.
25. Disconnect the electrical connections, as needed.
26. Remove the fastener that retains the radio antenna cable to the instrument panel.
27. Remove the instrument panel from the vehicle.
28. If replacing the instrument panel carrier, retain parts for assembly onto the new instrument panel carrier.

Installation Procedure

1. Install retained parts from the original instrument panel.

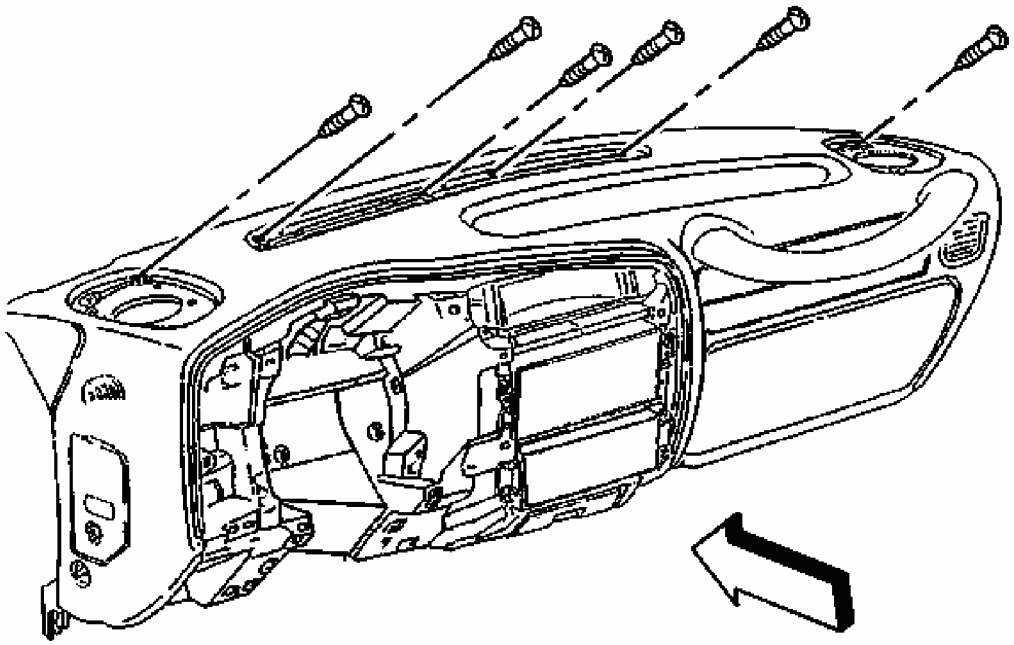


Fig. 56: Locating Top Instrument Panel Screws
Courtesy of GENERAL MOTORS CORP.

Install the instrument panel to the vehicle.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the fastener that retains the radio antenna cable to the instrument panel.

   Tighten: Tighten the fastener to 1.9 N.m (17 lb in).

3. Connect the electrical connectors, as needed.
4. Roll the instrument panel up.
5. Install the top instrument panel screws.

   Tighten: Tighten the screws to 1.9 N.m (17 lb in).

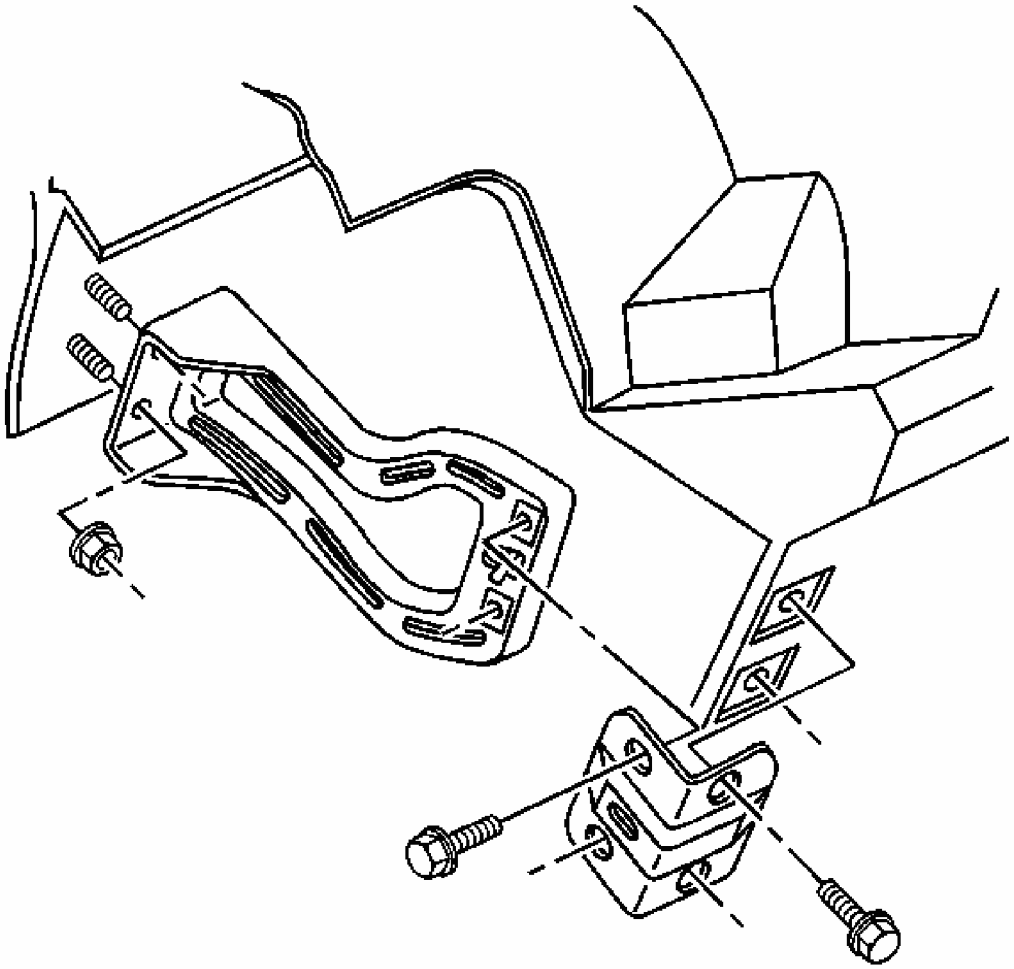


Fig. 57: View Of Knee Bolster Bracket
Courtesy of GENERAL MOTORS CORP.

6. Raise the steering column into position. Refer to **Steering Column Replacement** in Steering Wheel and Column.
7. Install the left and right instrument panel driver knee bolster brackets.

   Tighten: Tighten the screws/bolts to 6.3 N.m (56 lb in).

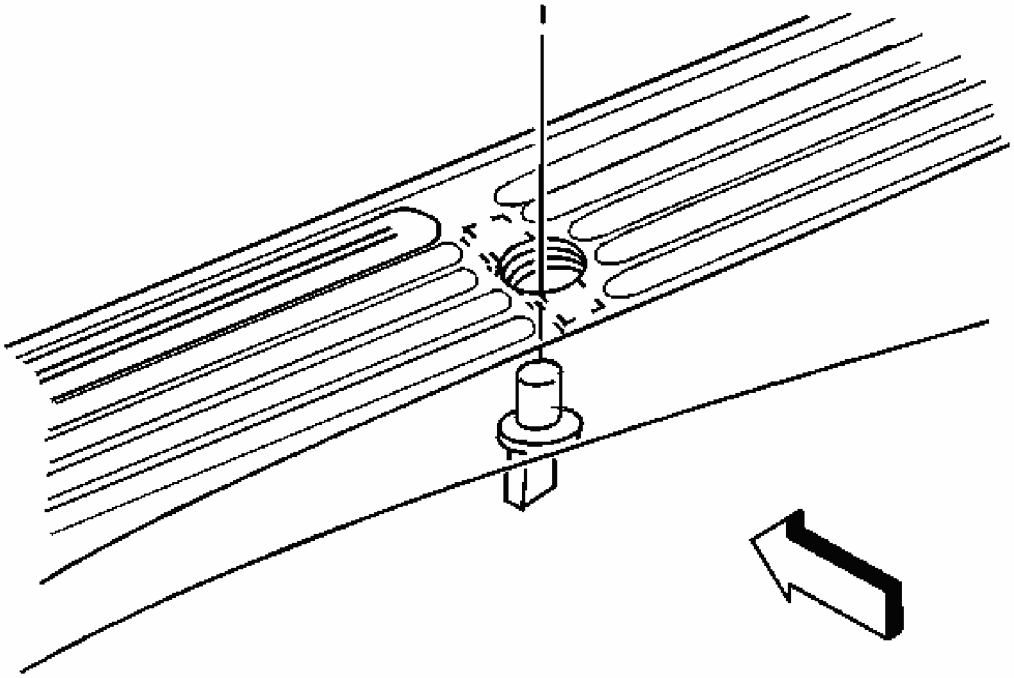


Fig. 58: View Of Sunload Sensor
Courtesy of GENERAL MOTORS CORP.

8. Enable the passenger side SIR system. Refer to **SIR Disabling and Enabling Zone 3** and **SIR Disabling and Enabling Zone 5** in SIR.
9. Install the HVAC control assembly to the instrument panel. Refer to **HVAC Control Assembly Replacement** in HVAC Systems - Manual.
10. Install the radio. Refer to **Radio Replacement (RPO Code UM6, UM7)** or **Radio Replacement (RPO Code UC6)** in Entertainment.
11. Install the instrument cluster. Refer to **Instrument Panel Cluster (IPC) Replacement** .
12. Install the knee bolster. Refer to **Knee Bolster Replacement** .

IMPORTANT: Always connect the purple electrical connector to the body control module (BCM) before connecting the brown electrical connector to the BCM.

13. Connect the purple electrical connector to the BCM.
14. Connect the brown electrical connector to the BCM.
15. If the vehicle is equipped with a sunload sensor, install the sensor to the defroster grille

by twisting the sensor 1/4 turn clockwise.

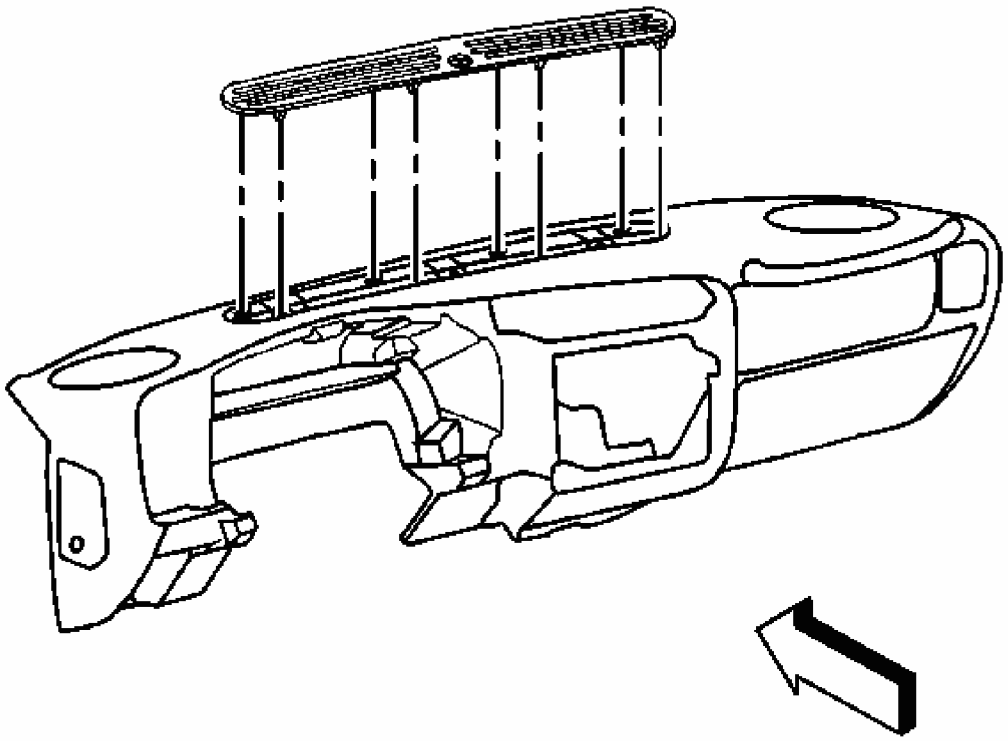


Fig. 59: View Of Windshield Defroster Grille
Courtesy of GENERAL MOTORS CORP.

16. Install the windshield defroster grille by carefully pressing the grille into place.
17. Install the left and right speakers and the speaker grilles. Refer to**Speaker Replacement - Front** in Entertainment.

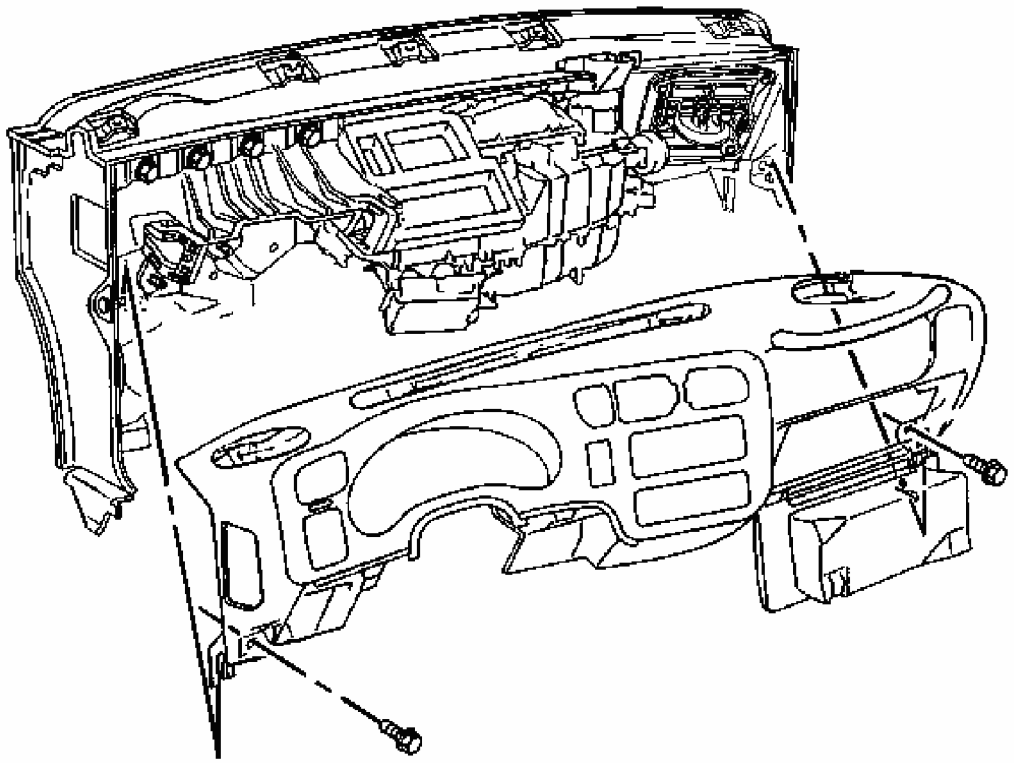


Fig. 60: View Of Instrument Panel Carrier
Courtesy of GENERAL MOTORS CORP.

18. Install the lower right instrument panel mounting bolt.

    Tighten: Tighten the bolt to 11.5 N.m (102 lb in).

19. Install the instrument panel storage compartment. Refer to **Door Replacement - Instrument Panel (I/P) Compartment** .
20. Install the lower left instrument panel bolt.

    Tighten: Tighten the bolt to 11.5 N.m (102 lb in).

21. Install the lower sound insulator. Refer to **Closeout/Insulator Panel Replacement - Instrument Panel (I/P) Lower** .
22. Install the right sound insulator. Refer to **Closeout/Insulator Panel Replacement - Right** .
23. Install the center console to the vehicle, if removed. Refer to **Console Replacement - Front Floor (Full Length (Auto Trans))** , **Console Replacement - Front Floor (Full**

Length (Envoy)) , **Console Replacement - Front Floor (Non-Full Length)** or **Console Replacement - Front Floor (Full-Length (Manual Trans))** .

24. Install the left sound insulator. Refer to **Closeout/Insulator Panel Replacement - Left** .
25. Connect the battery negative cable.
26. On vehicles equipped with an automatic transmission, perform the following steps:
    A. Turn the ignition switch to the RUN position.
    B. Depress the brake pedal and shift the transmission to the PARK position.
    C. Release the park brake.
27. On vehicles equipped with a manual transmission, install the shift lever. Refer to **Shift Tower Replacement** in Manual Transmission - NV 3500.

CONSOLE REPLACEMENT - FRONT FLOOR (FULL LENGTH (AUTO TRANS))

Removal Procedure

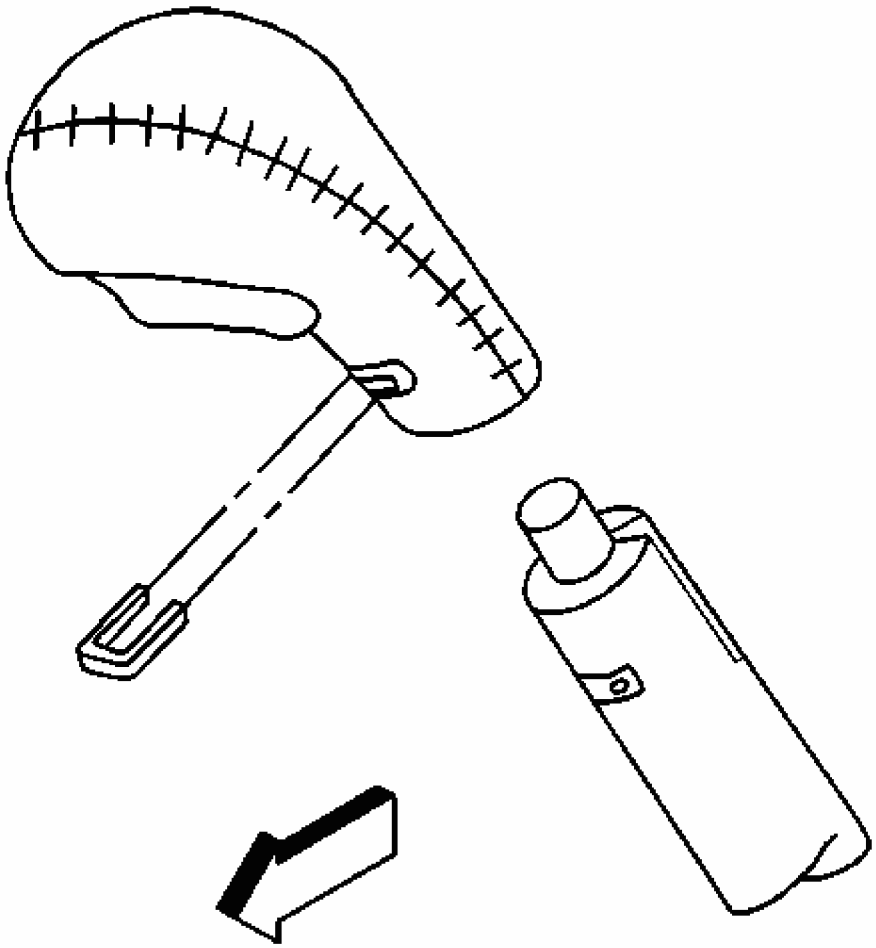


Fig. 61: View Of Shift Handle
Courtesy of GENERAL MOTORS CORP.

1. Remove the shift handle retaining clip at the front of the handle.
2. Remove the shift handle from the shift lever.

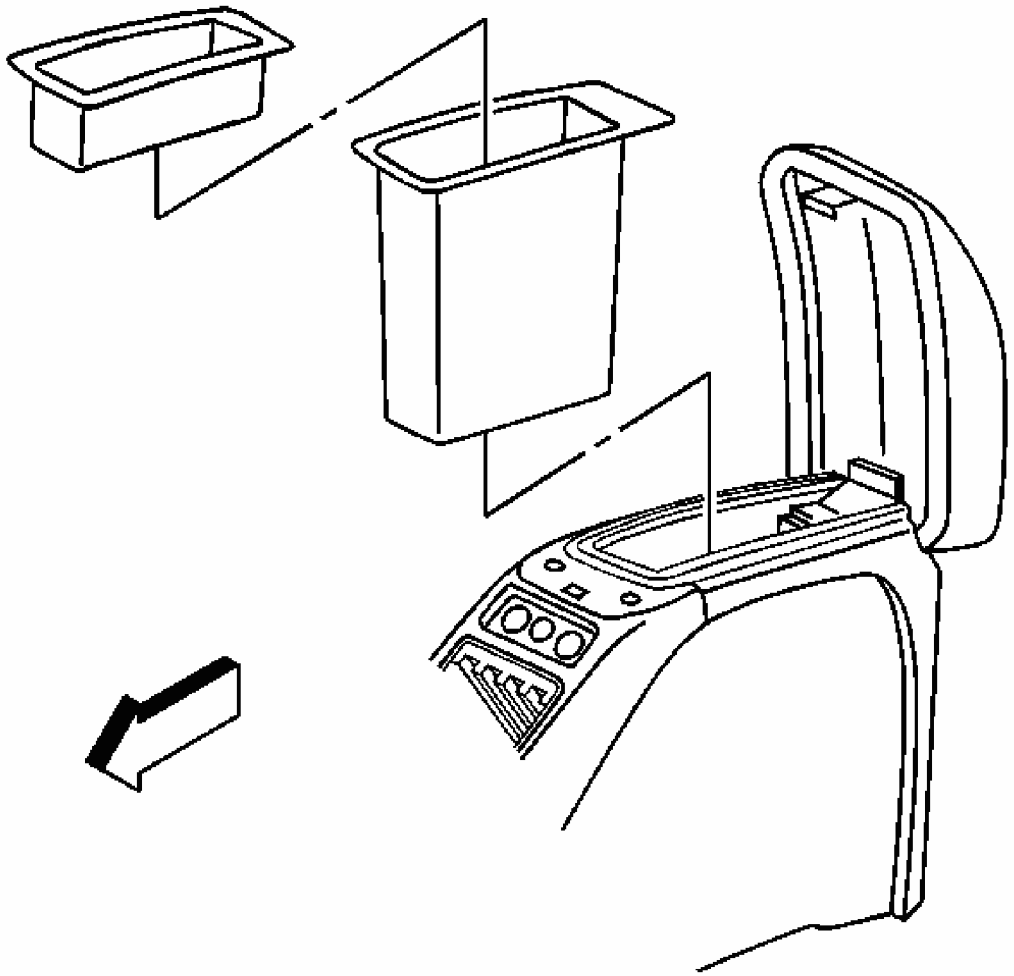


Fig. 62: Identifying Console Compartment Inserts
Courtesy of GENERAL MOTORS CORP.

3. Open the console lid.
4. Remove the console compartment inserts.

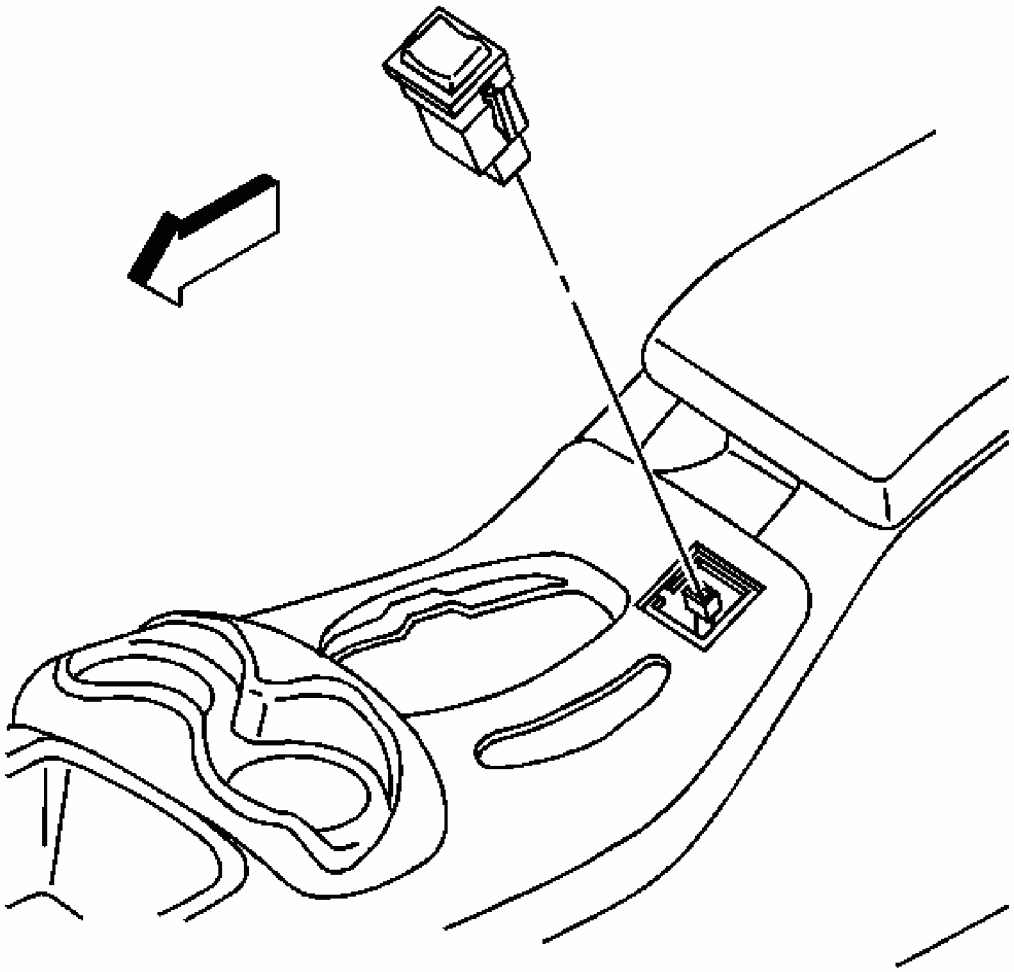


Fig. 63: Locating Transmission Select Switch
Courtesy of GENERAL MOTORS CORP.

5. Remove the transmission select switch (if equipped).

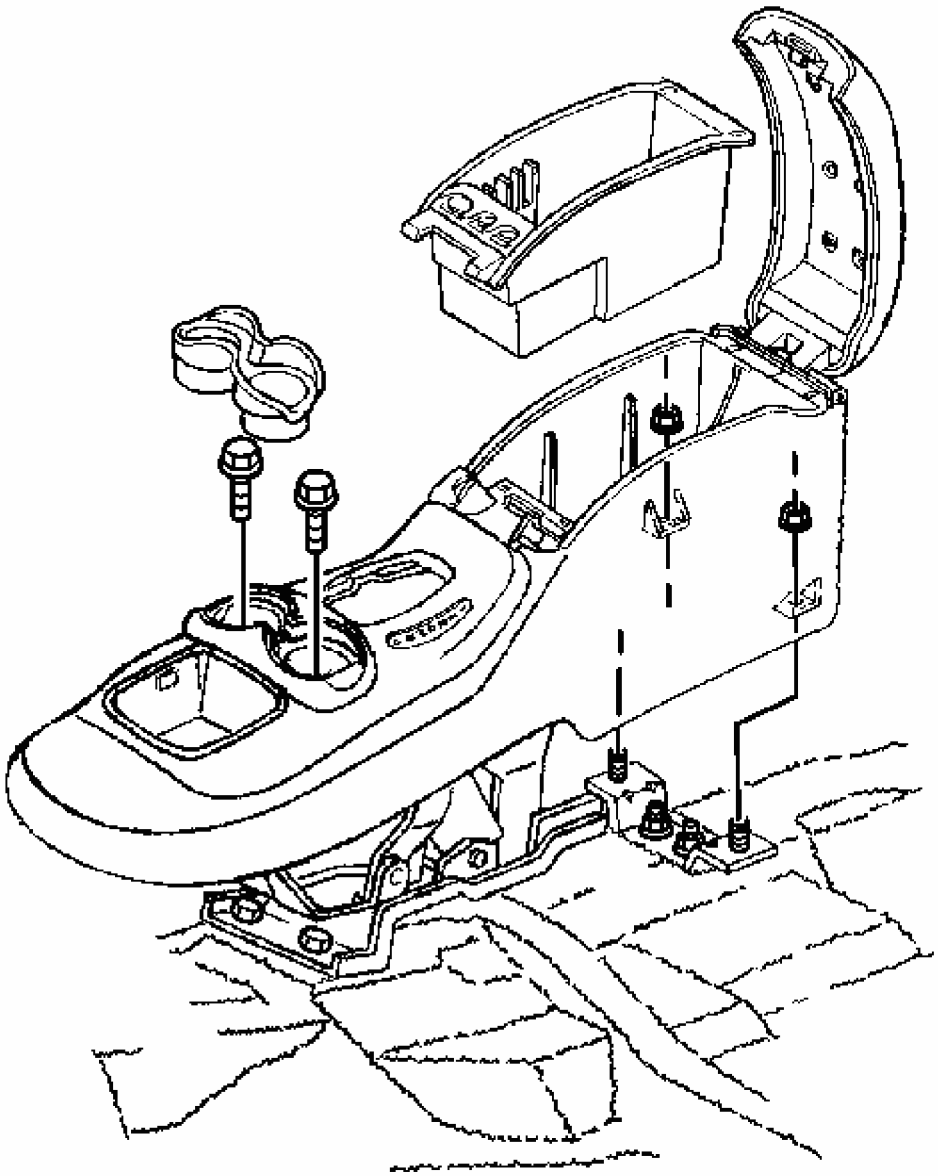


Fig. 64: View Of Console
Courtesy of GENERAL MOTORS CORP.

6. Remove the nuts that retain the rear of the console.
7. Remove the cup holder insert.
8. Remove the screws that retain the front of the console to the vehicle.
9. Remove the console from the vehicle.

Installation Procedure

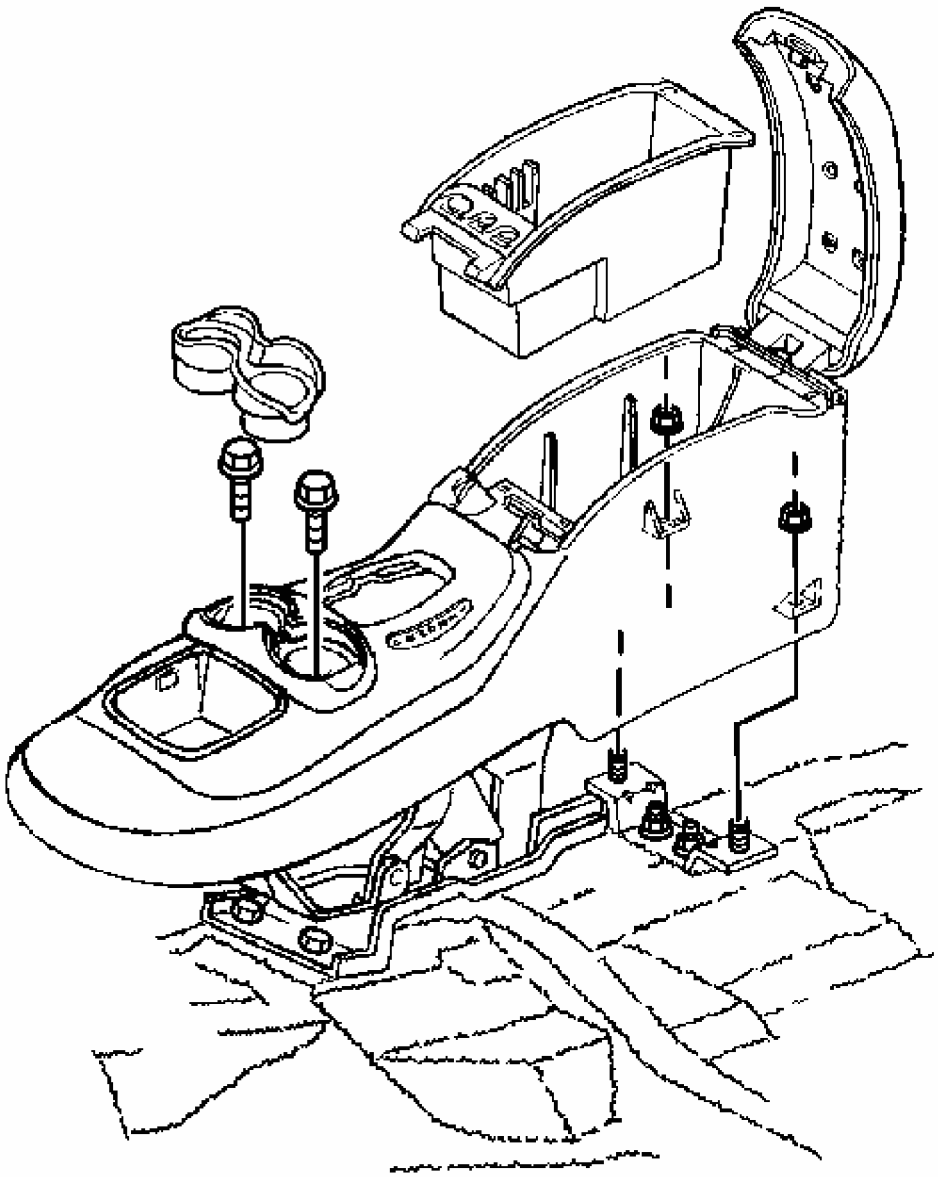


Fig. 65: View Of Console
Courtesy of GENERAL MOTORS CORP.

1. Install the console to the vehicle.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the screws that retain the front of the console.

   Tighten: Tighten the screws to 7 N.m (63 lb in).

3. Install the cup holder insert.
4. Install the nuts that retain the rear of the console.

   Tighten: Tighten the nuts to 10 N.m (89 lb in).

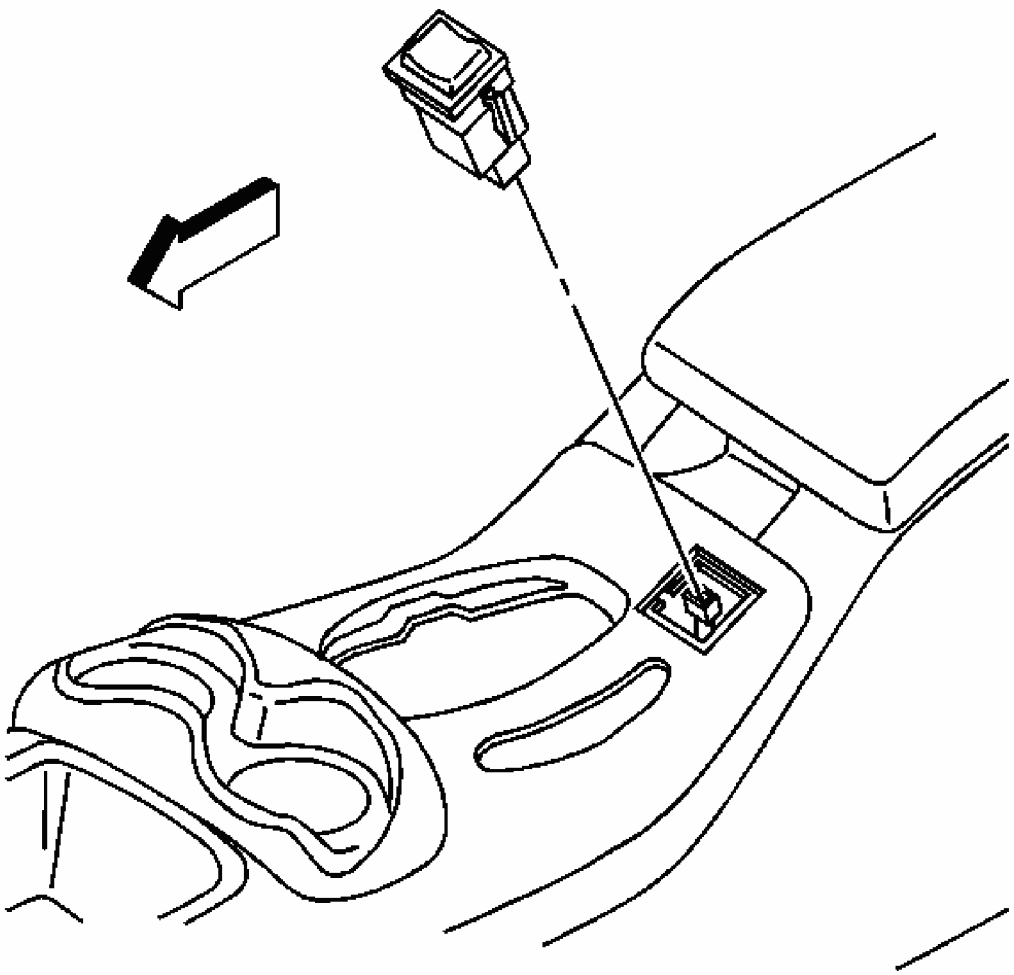


Fig. 66: Locating Transmission Select Switch
Courtesy of GENERAL MOTORS CORP.

5. Install the transmission select switch (if equipped).

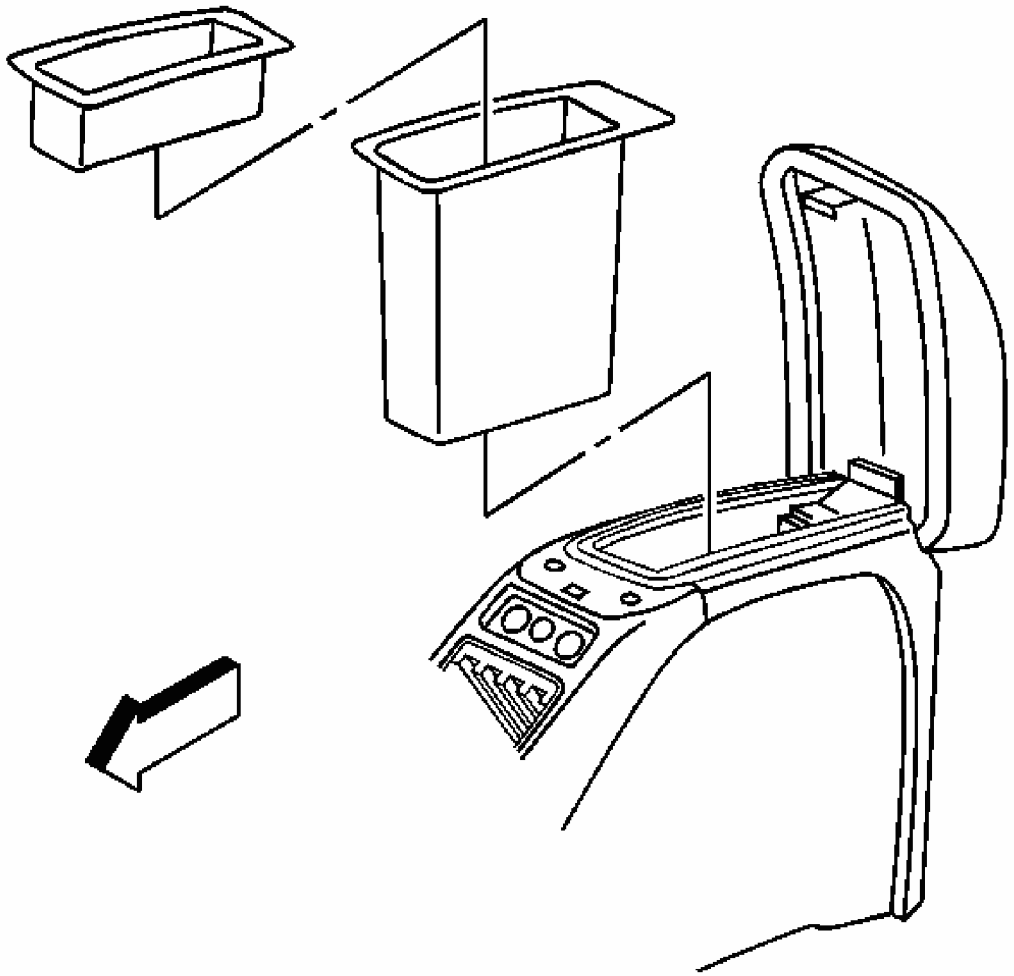


Fig. 67: Identifying Console Compartment Inserts
Courtesy of GENERAL MOTORS CORP.

6. Install the console compartment insert.
7. Install the console compartment insert screws.

Tighten: Tighten the nuts to 1.9 N.m (17 lb in).

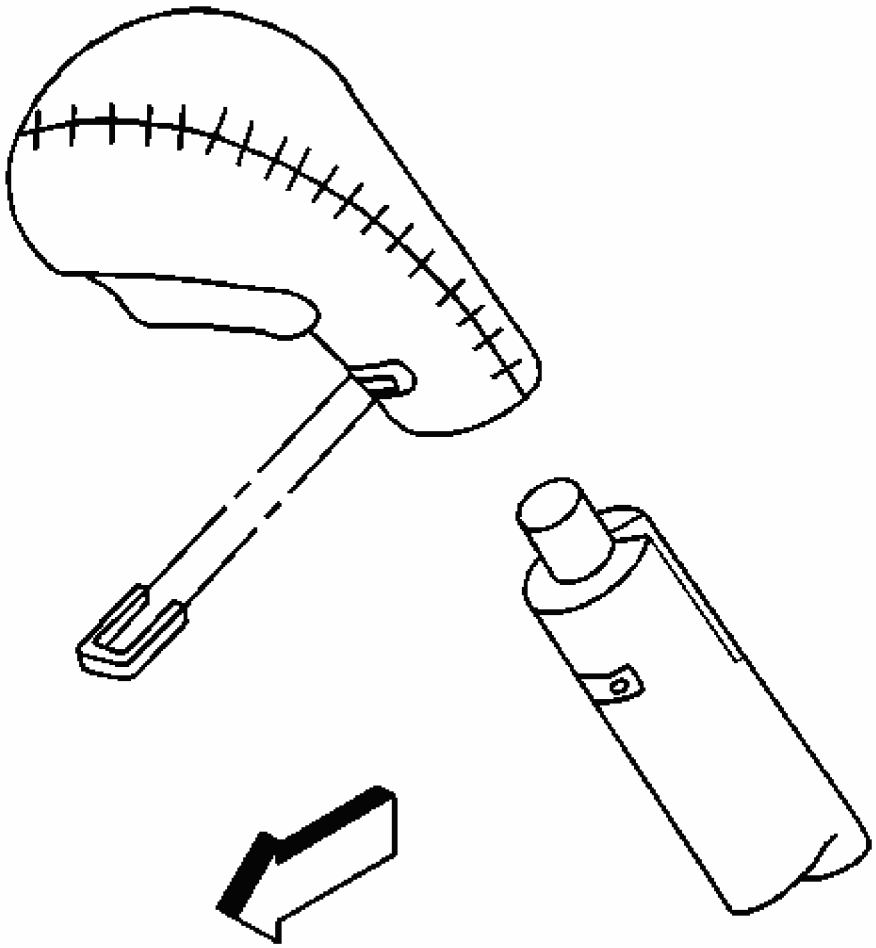


Fig. 68: View Of Shift Handle
Courtesy of GENERAL MOTORS CORP.

8. Install the shift handle to the shift lever.
9. Install the shift handle retaining clip at the front of the handle.

CONSOLE REPLACEMENT - FRONT FLOOR (FULL LENGTH (ENVOY))

Removal Procedure

1. Remove the front ashtray from console by gently prying out the ashtray with a flat-bladed tool.
2. Carefully lift up on the wood shifter assembly close-out in order to remove the assembly from the console. The closeout panel will need to be rotated to fit over the

shift handle.

3. Remove the passenger side toe-panel by gently prying out the panel using a flat-bladed tool.

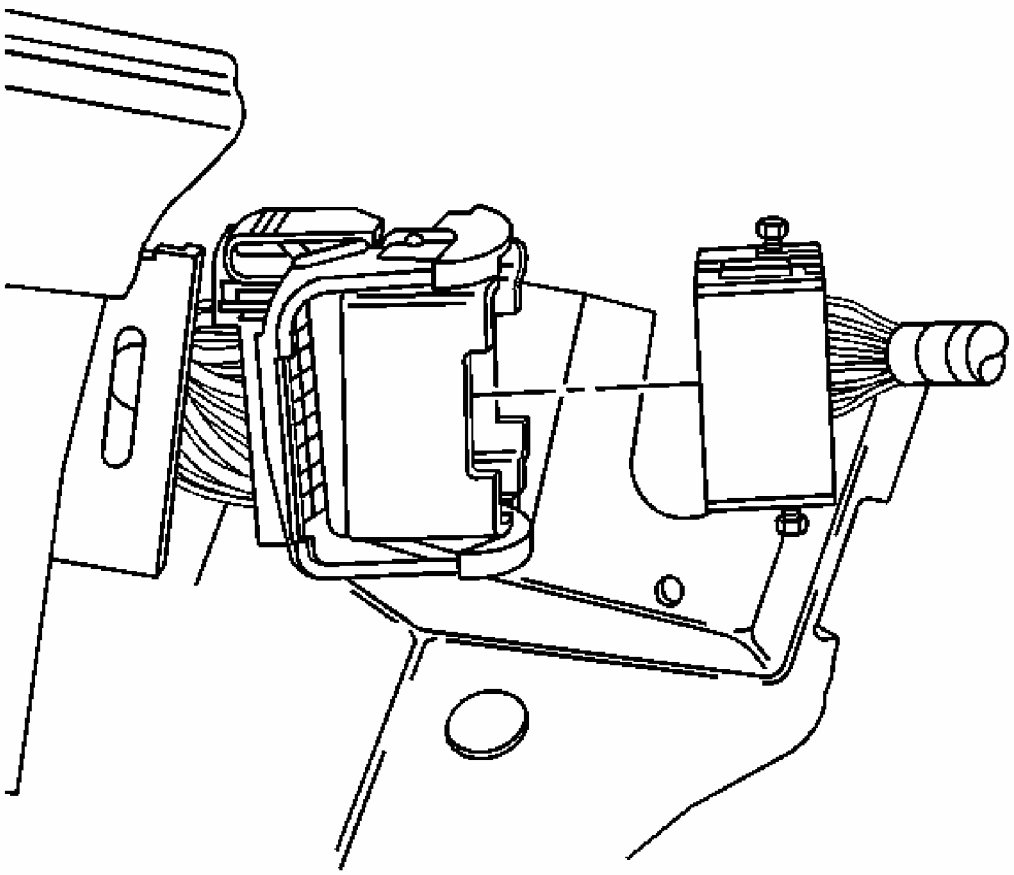


Fig. 69: View Of Instrument Panel To Console Wiring Harness Connection
Courtesy of GENERAL MOTORS CORP.

4. Disconnect the instrument panel to console wiring harness connection.

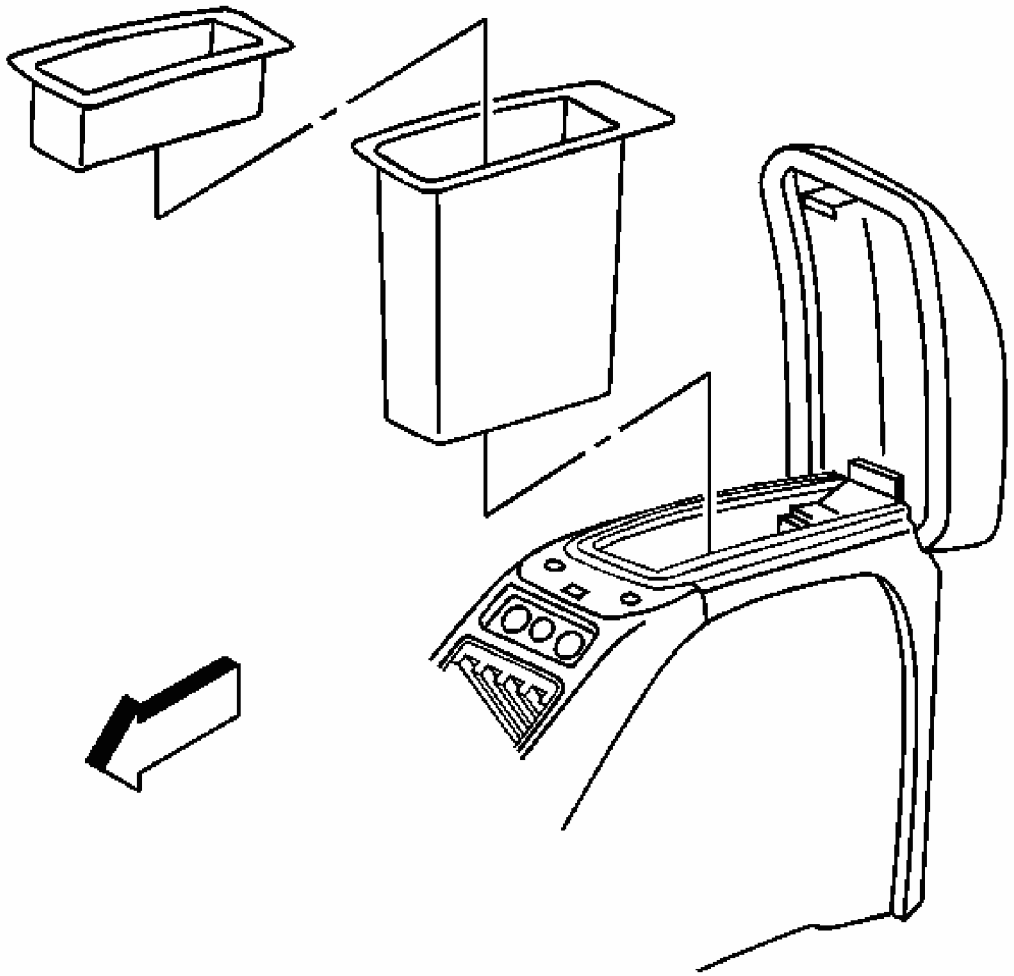


Fig. 70: Identifying Console Compartment Inserts
Courtesy of GENERAL MOTORS CORP.

5. Open the armrest in order to expose and remove the convenience tray from storage compartment.

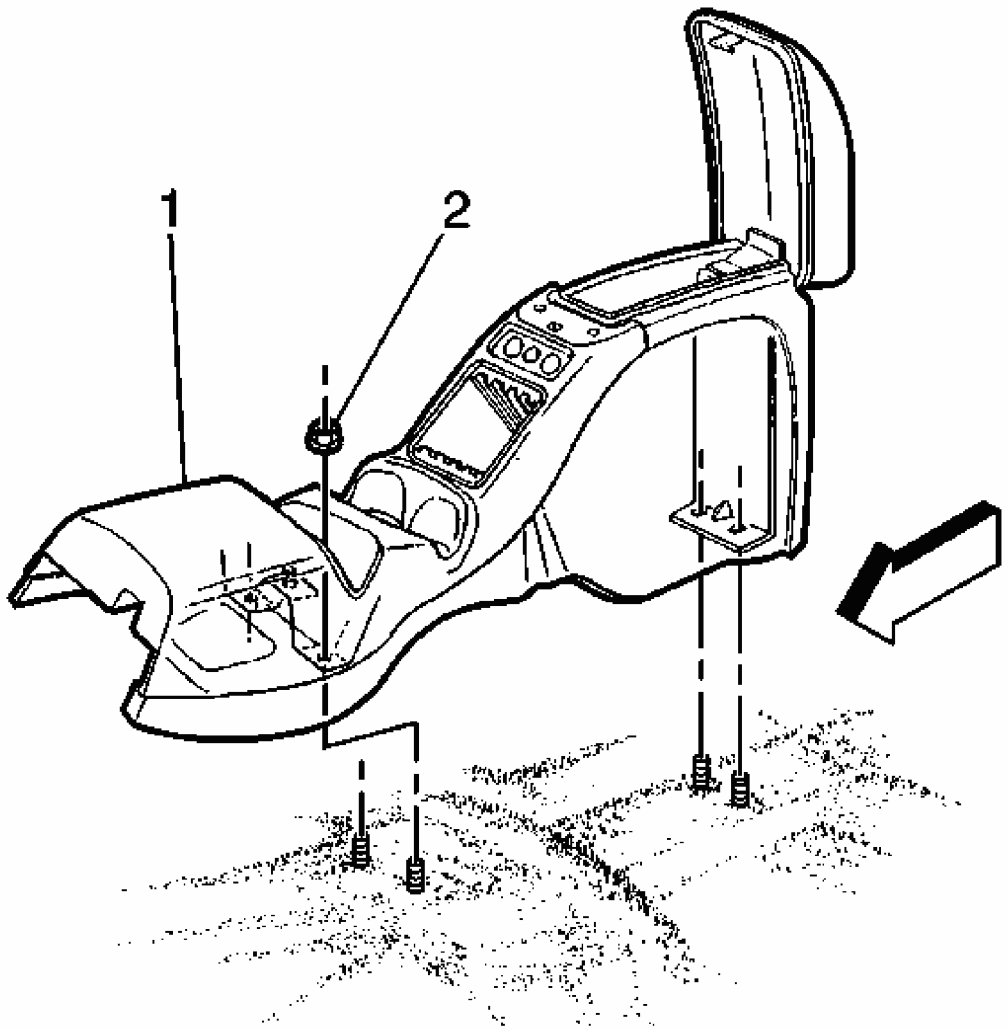


Fig. 71: View Of Console
Courtesy of GENERAL MOTORS CORP.

6. Remove the fasteners (2) that retain the console (1) to the shifter assembly and the vehicle floor.
7. Remove the console from the vehicle by lifting the console over the floor studs.
8. If replacing the center console, remove the compact disc player from the console. Refer to **Remote CD Player Replacement** in Entertainment.
9. If replacing the center console, remove the amplifier from the console. Refer to**Amplifier Replacement** in Entertainment.
10. If replacing the center console, remove the rear seat audio control from the console. Refer to**Audio Control Replacement - Rear Seat** in Entertainment.

11. If replacing the center console, remove and retain the console wiring harness for use on the new console.

Installation Procedure

1. Install the console wiring harness to the console.
2. Install the rear seat audio control to the console. Refer to **Audio Control Replacement - Rear Seat** in Entertainment.
3. Install the amplifier from the console. Refer to **Amplifier Replacement** in Entertainment.
4. Install the compact disc player from the console. Refer to **Remote CD Player Replacement** in Entertainment.

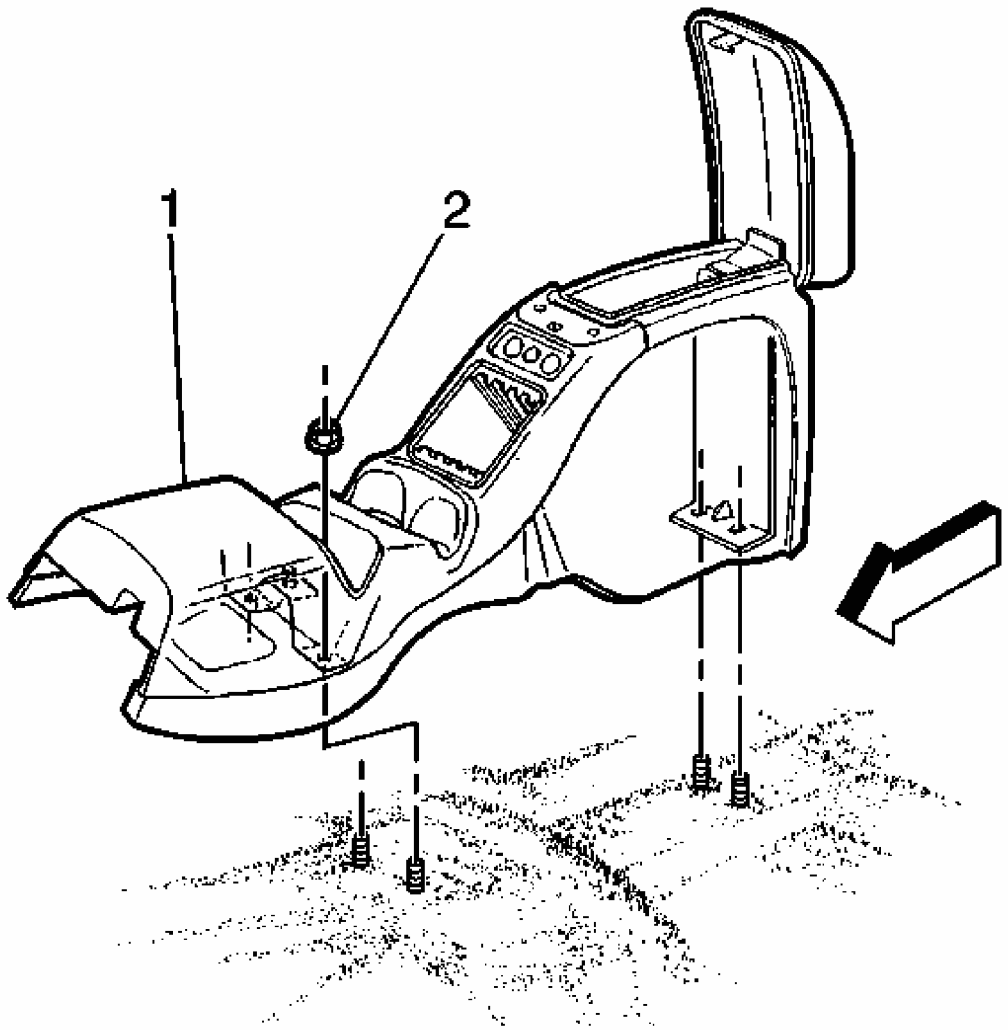


Fig. 72: View Of Console
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not pinch the instrument panel to console wiring harness during this process.

5. Install the console to the vehicle by lifting the console (1) over and onto the floor studs.

NOTE: Refer to Fastener Notice in Cautions and Notices.

6. Install the fasteners (2) that retain the console to the vehicle.

Tighten: Tighten the console to the vehicle retainers to 10 N.m (88 lb in).

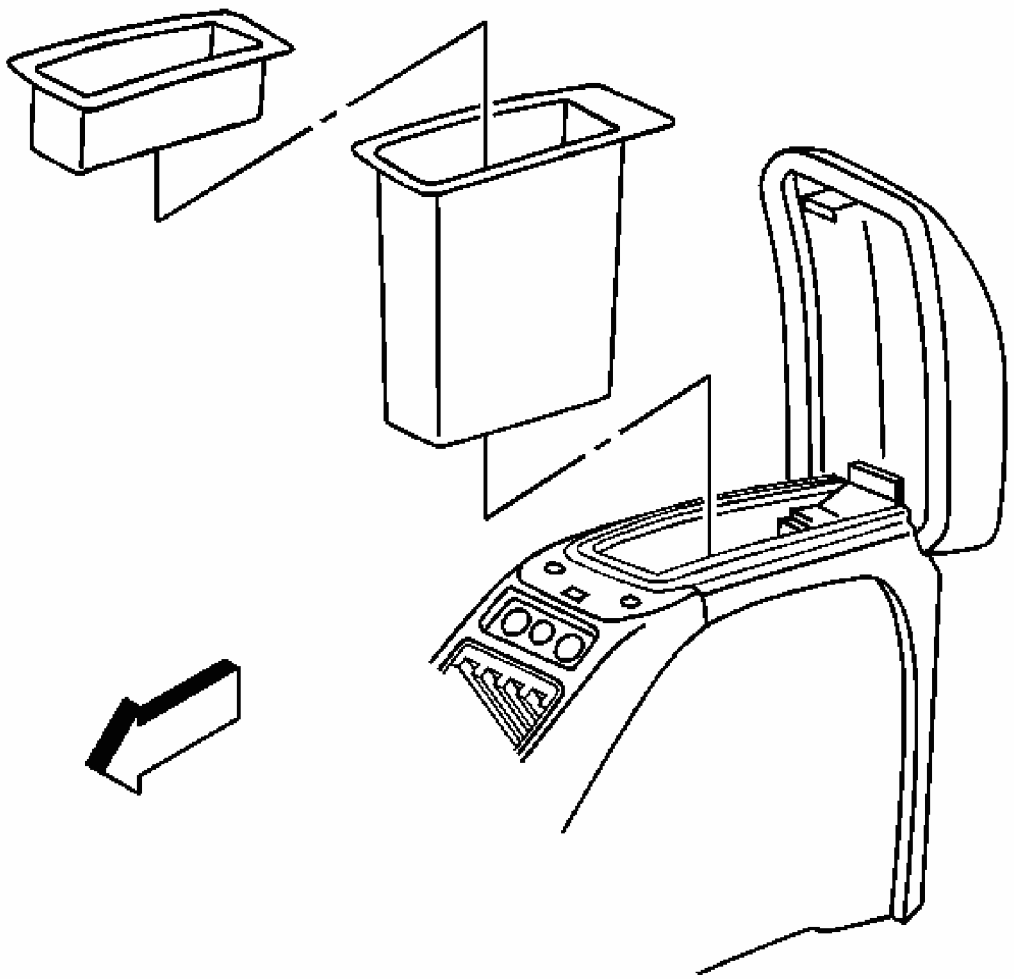


Fig. 73: Identifying Console Compartment Inserts
Courtesy of GENERAL MOTORS CORP.

7. Install the convenience tray to the armrest storage compartment.

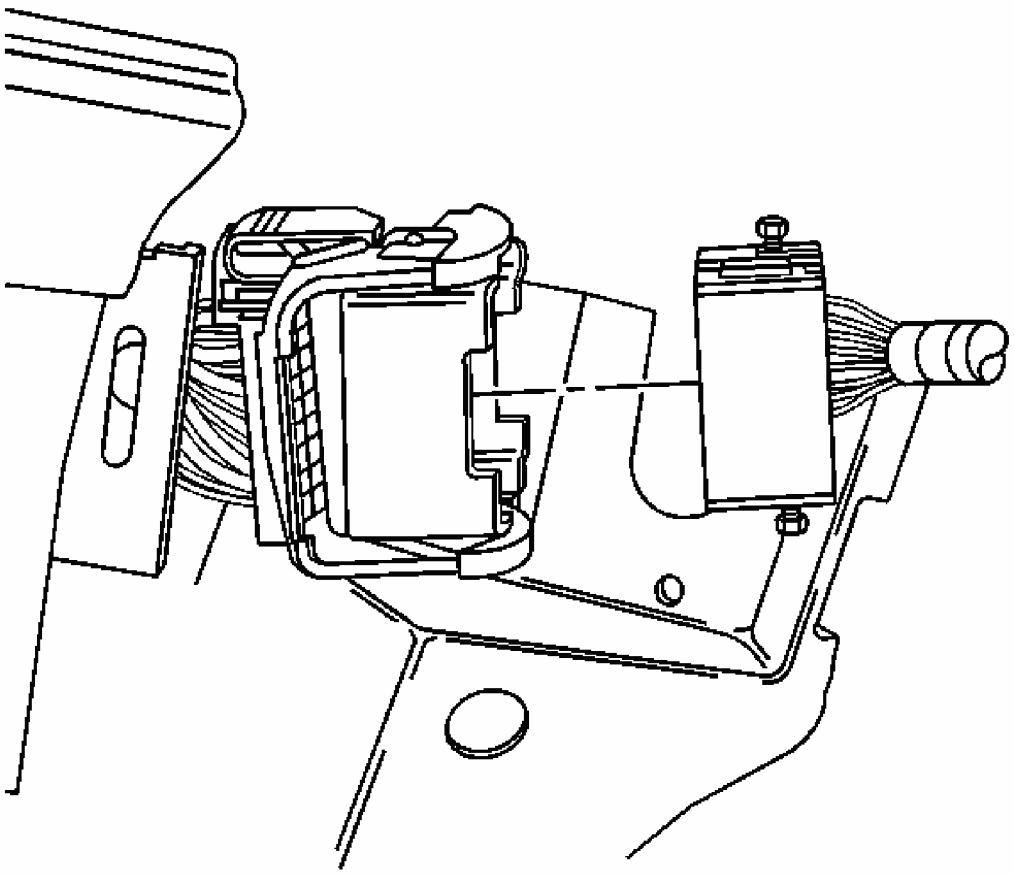


Fig. 74: View Of Instrument Panel To Console Wiring Harness Connection
Courtesy of GENERAL MOTORS CORP.

8. Connect the instrument panel to console wiring harness connection
9. Install the passenger side toe-panel by firmly pressing the toe-panel into place.
10. Carefully press the wood shifter assembly close-out into place. The closeout panel will need to be rotated in order to fit over the shift handle
11. Install the front ashtray to the console by firmly pressing the ashtray into place.

CONSOLE REPLACEMENT - FRONT FLOOR (NON-FULL LENGTH)

Removal Procedure

1. For manual transmission only, remove the shift control lever. Refer to **Control Lever and/or Boot Replacement** in Manual Transmission- NV 3500.

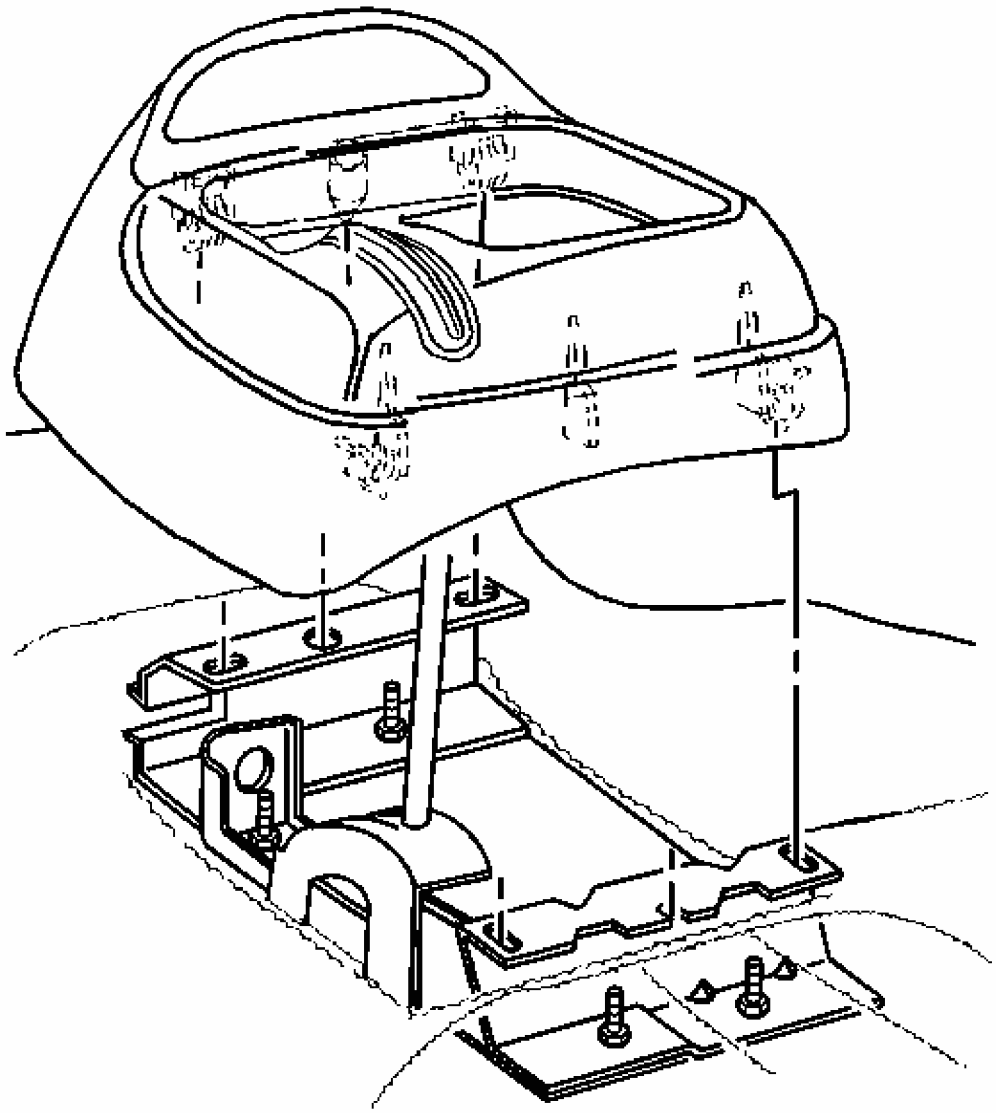


Fig. 75: View Of Console
Courtesy of GENERAL MOTORS CORP.

2. Remove the console from the floor.

   Pull up on the console in order to release the retainer clips.

Installation Procedure

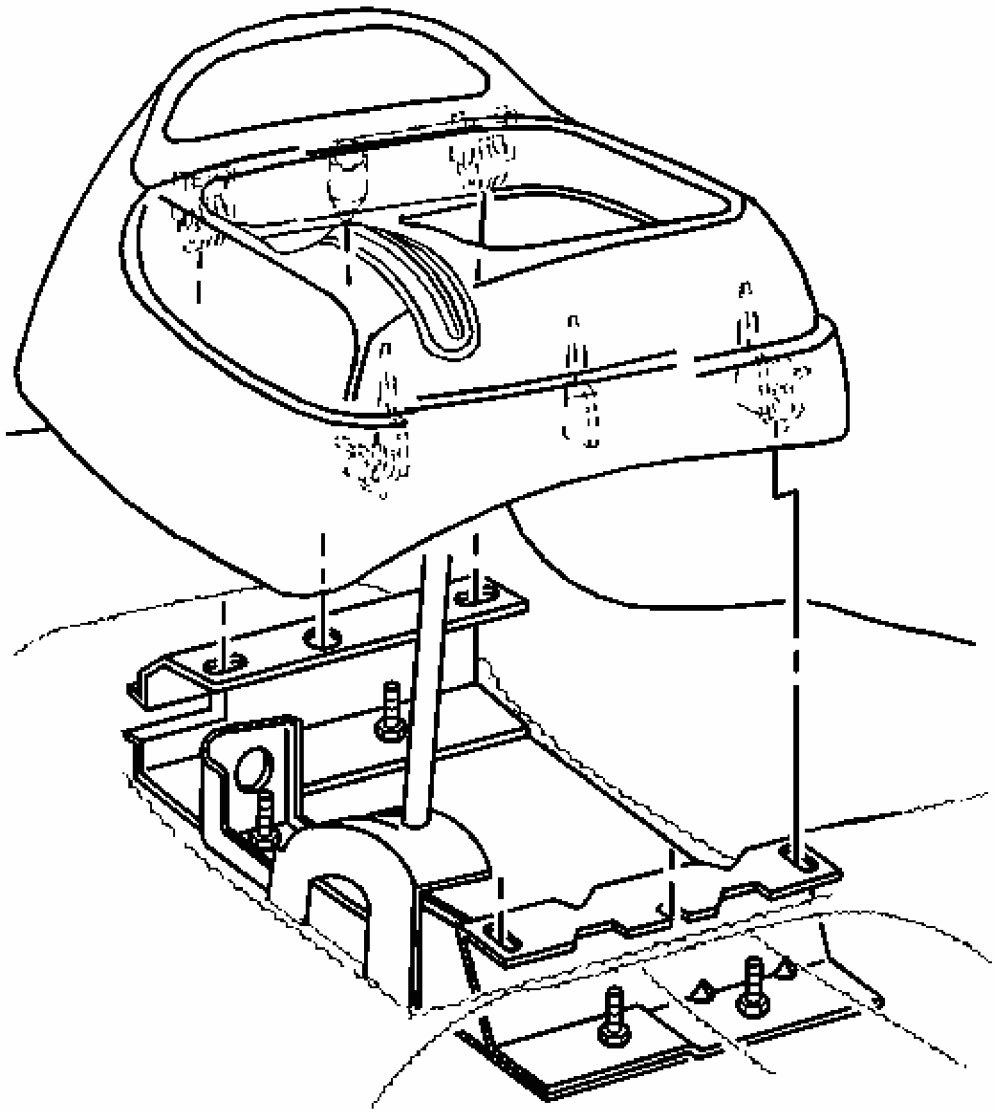


Fig. 76: View Of Console
Courtesy of GENERAL MOTORS CORP.

1. Use care when installing the console so the clips do not bend.
2. install the console to the floor.
3. For manual transmission only, install the shift lever. Refer to **Control Lever and/or Boot Replacement** in Manual Transmission- NV 3500.

CONSOLE REPLACEMENT - FRONT FLOOR (FULL-LENGTH (MANUAL TRANS))

Removal Procedure

1. Remove the shift control lever. Refer to **Control Lever and/or Boot Replacement** in Manual Transmission- NV 3500.

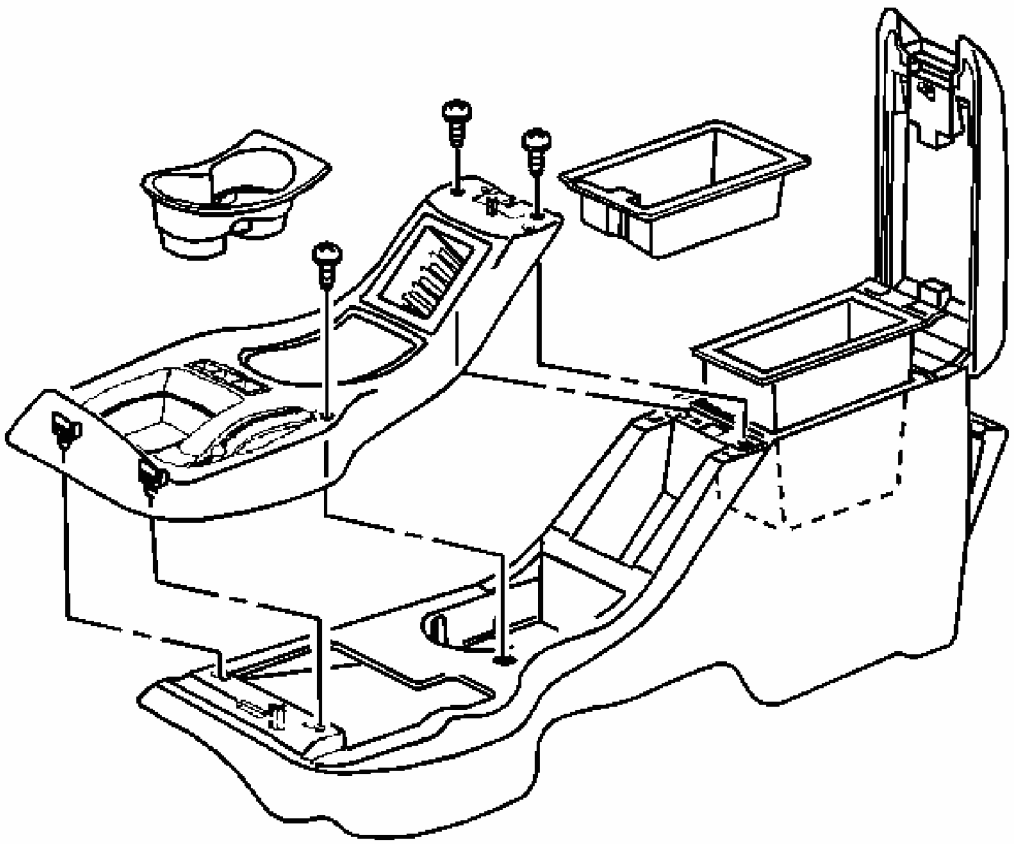


Fig. 77: View Of Console
Courtesy of GENERAL MOTORS CORP.

2. Remove the cup holder insert.
3. Remove the screws that retain the trim plate to the console.
4. Remove the trim plate from the console.

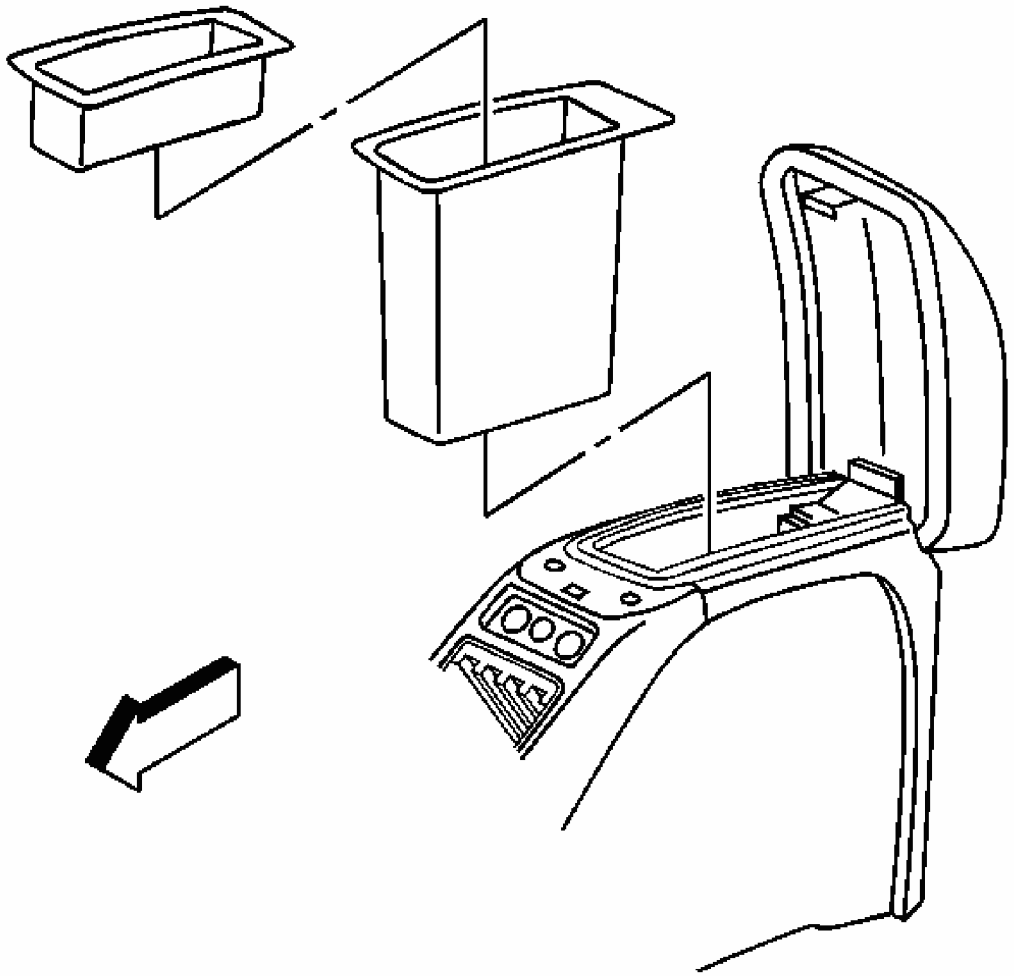


Fig. 78: Identifying Console Compartment Inserts
Courtesy of GENERAL MOTORS CORP.

5. Open the storage compartment cover.
6. Remove the storage compartment.

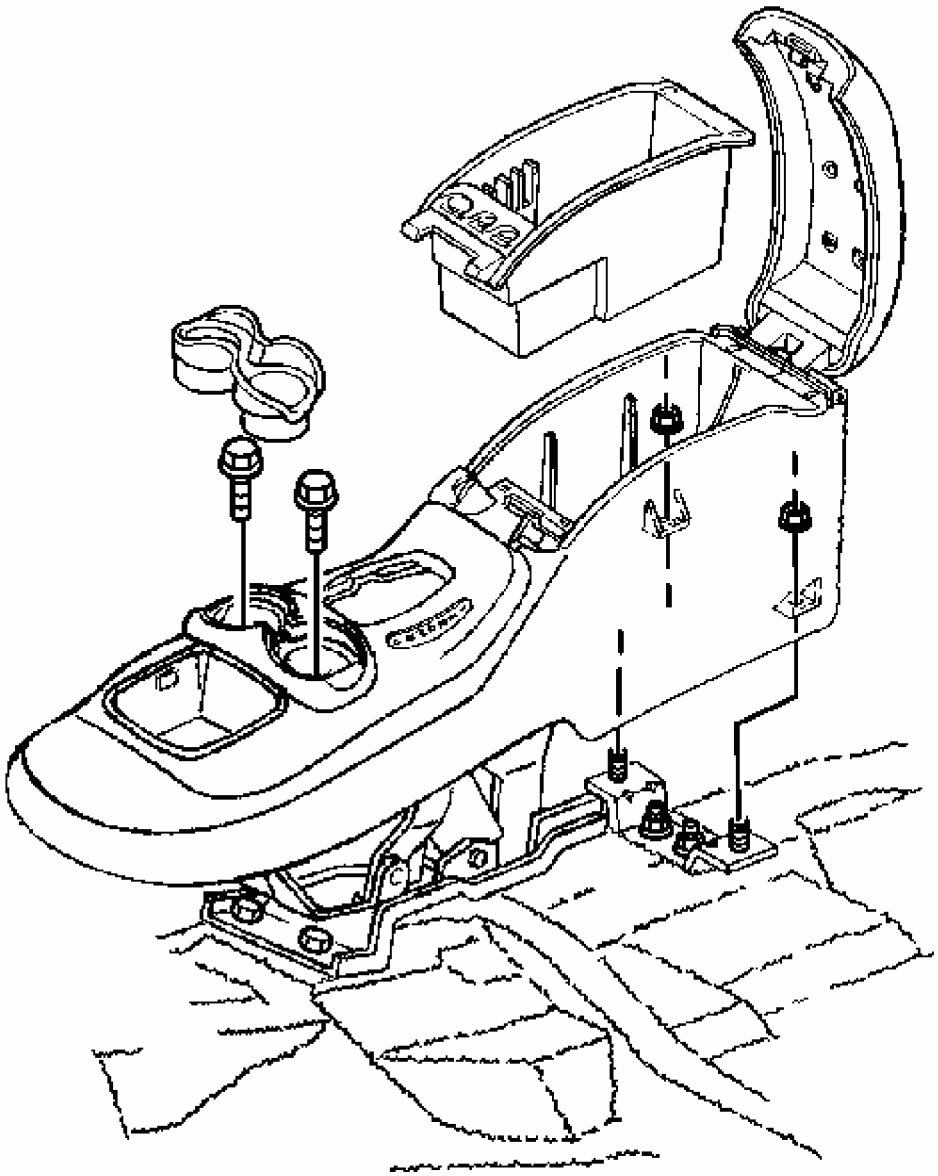


Fig. 79: View Of Console
Courtesy of GENERAL MOTORS CORP.

7. Remove the nuts that retain the console to the vehicle.
8. Disconnect the electrical connector, if equipped.
9. Remove the console from the vehicle.

Installation Procedure

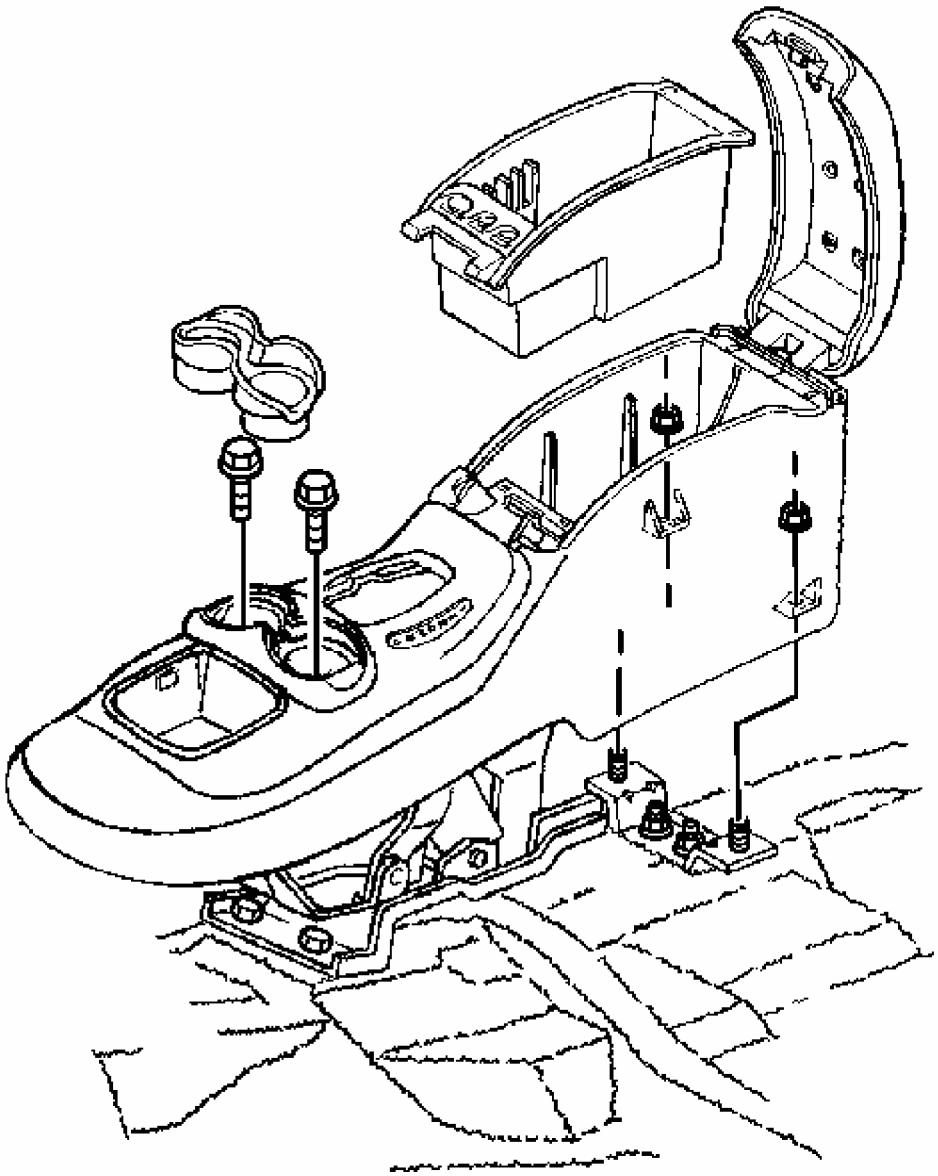


Fig. 80: View Of Console
Courtesy of GENERAL MOTORS CORP.

1. Install the console to the vehicle.
2. Connect the electrical connector, if equipped.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the nuts that retain the console to the vehicle.

   Tighten: Tighten the nuts to 10 N.m (88 lb in).

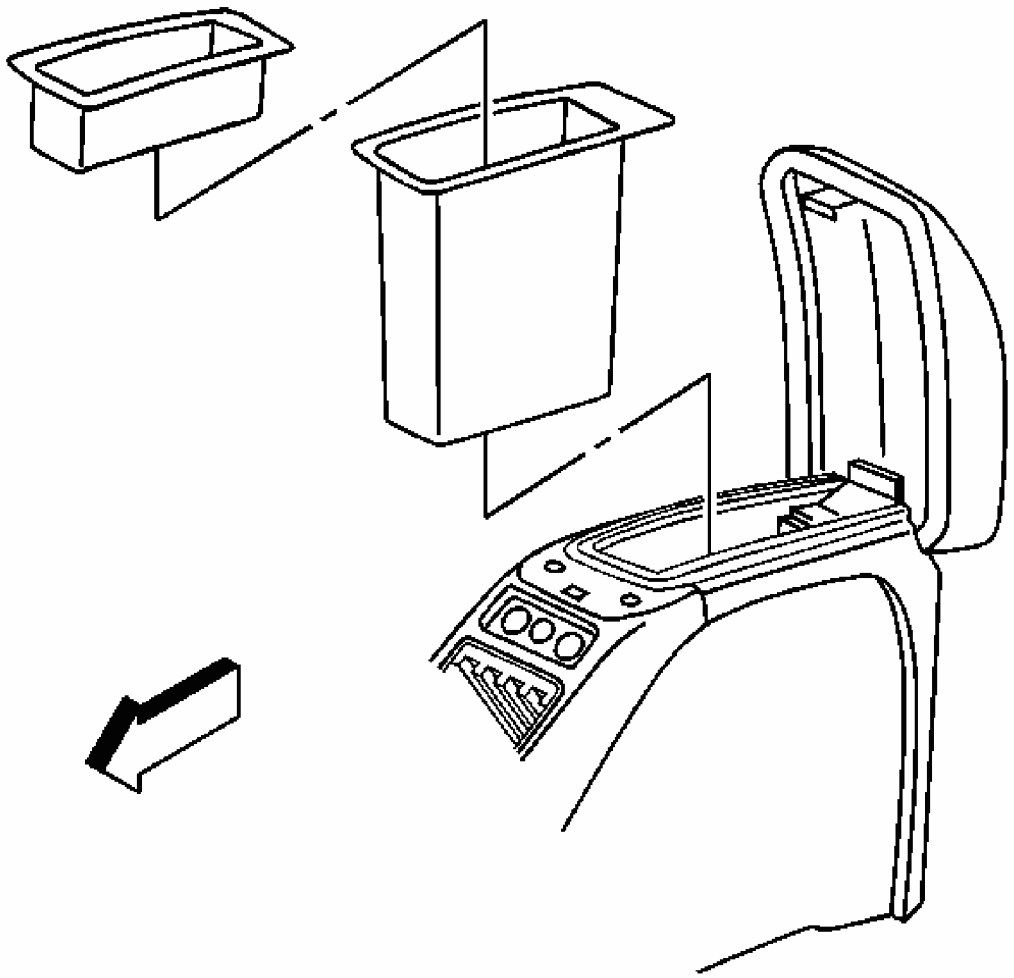


Fig. 81: Identifying Console Compartment Inserts
Courtesy of GENERAL MOTORS CORP.

4. Install the storage compartment to the vehicle.

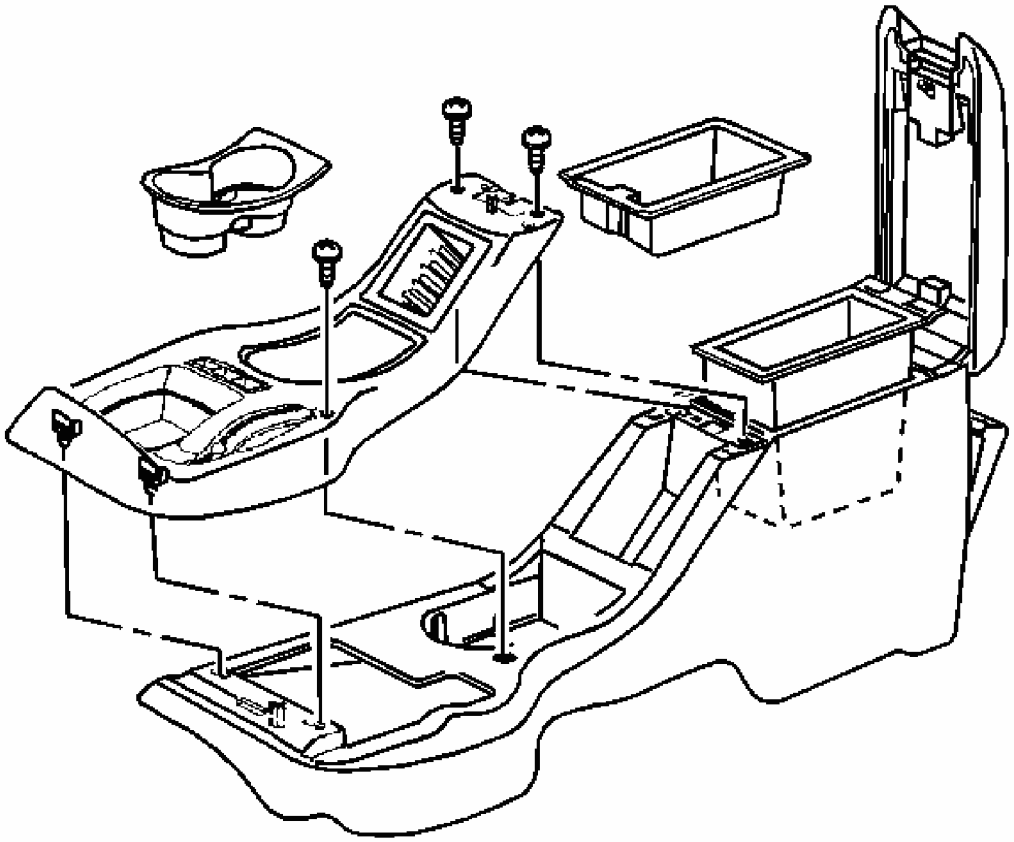


Fig. 82: View Of Console
Courtesy of GENERAL MOTORS CORP.

5. Install the trim plate to the console.
6. Install the screws that retain the trim plate to the console.

   Tighten: Tighten the nuts to 1.9 N.m (17 lb in).

7. Install the cup holder insert.
8. Install the shift control lever. Refer to **Control Lever and/or Boot Replacement** in Manual Transmission- NV 3500.

CUPHOLDER REPLACEMENT - FRONT FLOOR CONSOLE

Removal Procedure

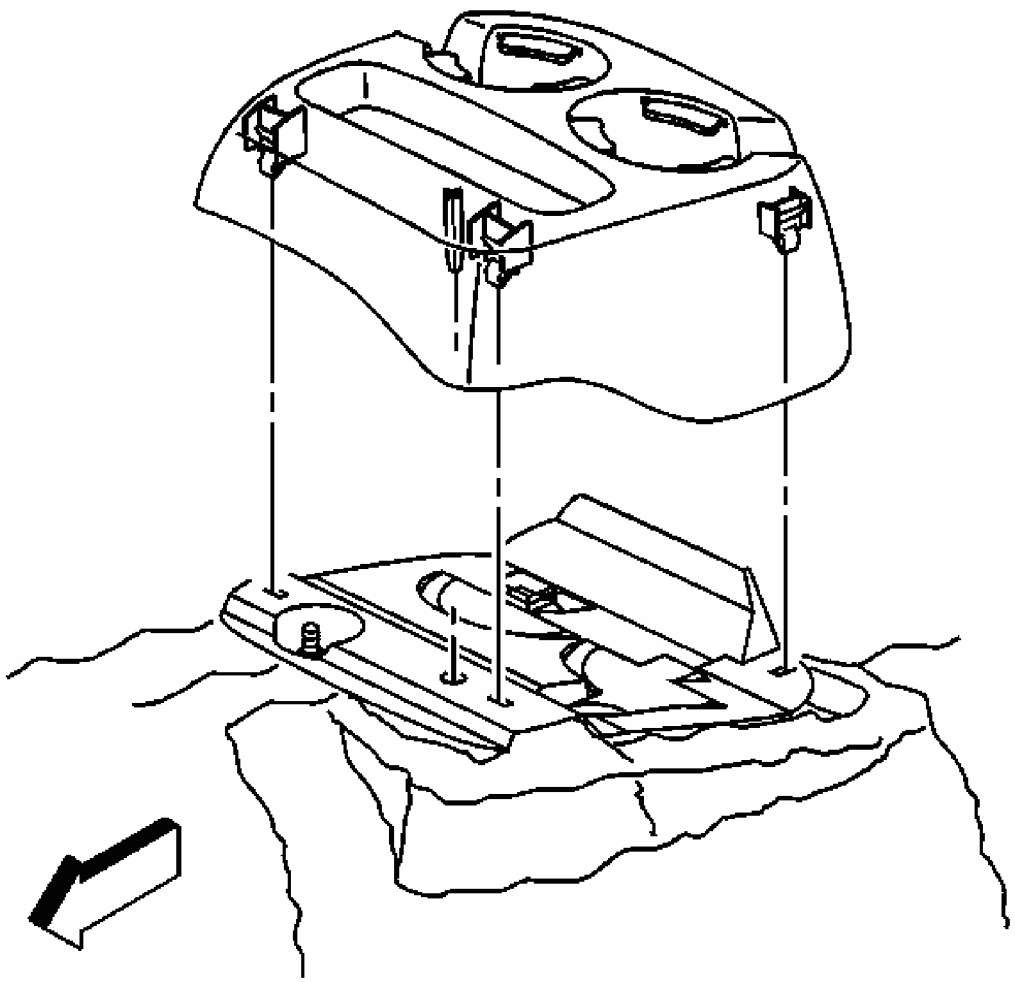


Fig. 83: View Of Cupholder
Courtesy of GENERAL MOTORS CORP.

Pull up on the lower edges of the cup holder in order to release the retaining clips and remove the cup holder from the vehicle.

Installation Procedure

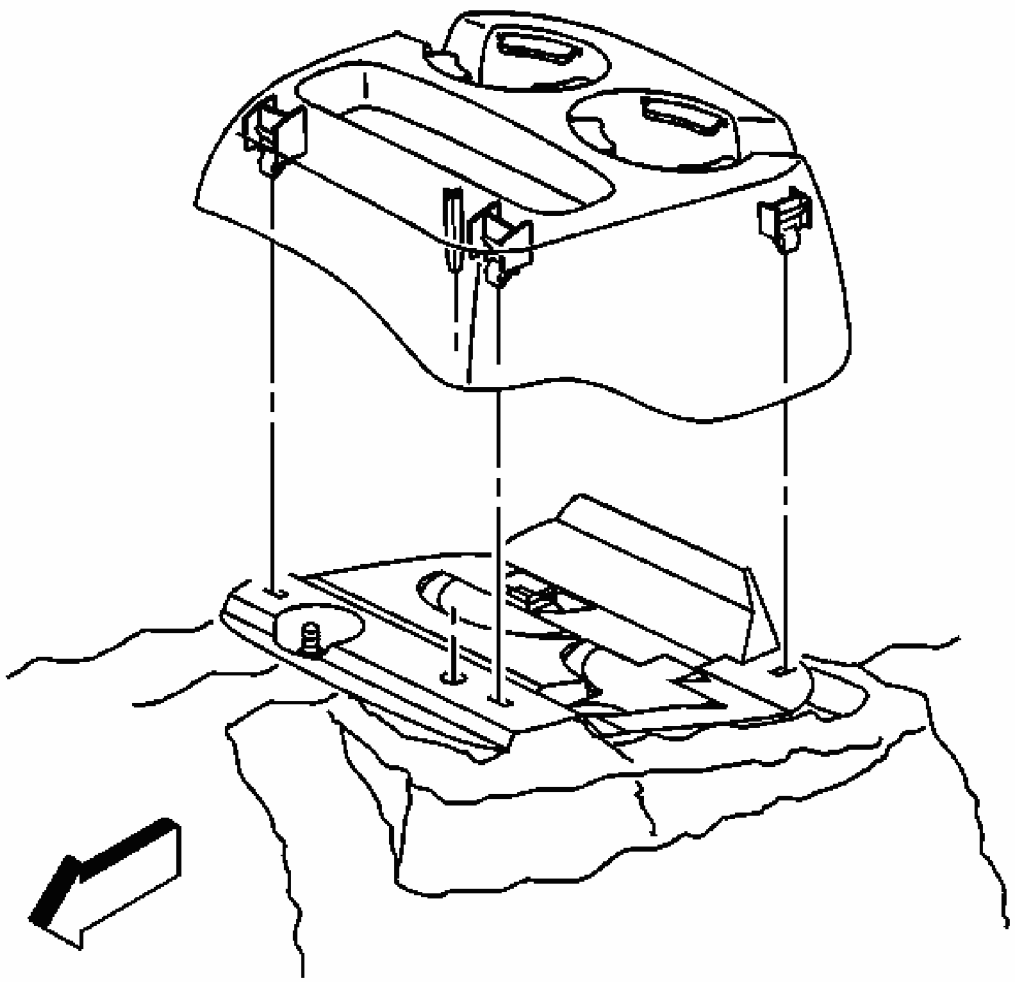


Fig. 84: View Of Cupholder
Courtesy of GENERAL MOTORS CORP.

Install the front floor cup holder to the vehicle.

DESCRIPTION AND OPERATION

INSTRUMENT PANEL CLUSTER (IPC) DESCRIPTION AND OPERATION

Displays Test

Certain instrument panel cluster (IPC) features are tested when the ignition is turned on in order to verify the features are working properly. The following indicators illuminate for 3 seconds:

- The ABS indicator
- The Charge indicator
- The BRAKE indicator
- The CHECK GAGES indicator
- The GATE AJAR indicator
- The LOW FUEL indicator
- The Park Brake indicator
- The SECURITY indicator
- The SERVICE 4WD indicator
- The SHIFT indicator
- The TOW / HAUL indicator
- All gages sweep to their minimum physical position and then to their actual physical position.

The following indicators illuminate for the specified times:

- The AIR BAG indicator flashes 7 times.
- The Fasten Safety Belt indicator illuminates for 20 seconds followed by 55 seconds of flashing with the drivers seatbelt unfastened, or, the Fasten Safety Belt indicator will illuminate for 8 seconds with the drivers seatbelt fastened.
- The SERVICE ENGINE SOON (MIL) indicator illuminates and remains on.

Indicators and Warning Messages

Refer to **Indicator/Warning Message Description and Operation** .

Engine Coolant Temperature Gage

The IPC displays the engine coolant temperature as determined by the PCM. The IPC receives a class 2 message from the PCM indicating the engine coolant temperature. The engine coolant temperature gage defaults to 100°F (40°C) or below if:

- The PCM detects a malfunction in the engine coolant temperature sensor circuit.
- The IPC detects a loss of class 2 communications with the PCM.

Engine Oil Pressure Gage

The IPC uses the engine oil pressure sensor signal to determine the engine oil pressure. The oil pressure sensor signal circuit is solely dedicated to the IPC. The engine oil pressure sensor signal to the IPC is a variable resistance ranging from 0-90 ohm. A sensor resistance of 1 ohm will display as 0 psi (0 kPa) and a resistance of 88 ohm will display as 80 psi (550 kPa).

Fuel Gage

The IPC displays the fuel level as determined by the PCM. The IPC receives a class 2 message from the PCM indicating the fuel level percent. The fuel gage defaults to empty if:

- The PCM detects a malfunction in the fuel level sensor circuit.
- The IPC detects a loss of class 2 communications with the PCM.

When the fuel level is less than a pre-determined value, the low fuel indicator illuminates.

Odometer

The IPC contains a season odometer and a trip odometer. Momentarily press the trip/reset switch on the IPC in order to toggle between the season odometer and the trip odometer. Press the trip/reset switch for greater than 2 seconds, while the trip odometer is displayed, in order to reset the trip odometer.

The IPC displays the vehicle mileage and trip mileage as determined by the IPC. The IPC calculates the mileage based on the vehicle speed signal circuit from the PCM. The odometer will display 'error' if an internal IPC memory failure is detected.

PRNDL Display

The IPC displays the selected gear position as determined by the PCM. The IPC receives a class 2 message from the PCM indicating the gear position. The PRNDL displays blank if:

- The PCM detects a malfunction in the transmission range switch circuit.
- The IPC receives a class 2 message indicating the park position and the column park switch indicates a position other than park such as an open input.
- The IPC detects a loss of class 2 communications with the PCM.

Speedometer

The IPC displays the vehicle speed based on the information from the PCM. The PCM converts the data from the vehicle speed sensor to a 4000 pulses/mile signal. The IPC uses the vehicle speed signal circuit from the PCM in order to calculate the vehicle speed. The speedometer defaults to 0 km/h (0 mph) if a malfunction in the vehicle speed signal circuit exists.

Tachometer

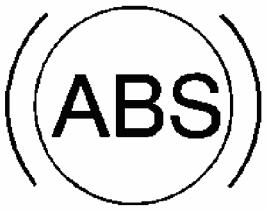
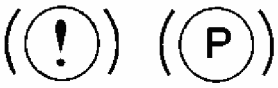
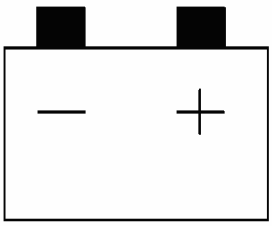
The IPC displays the engine speed based on the information from the PCM. The PCM converts the data from the engine speed sensor to a 2 pulses/engine revolution signal. The IPC uses the engine speed signal circuit from the PCM in order to calculate the engine speed. The tachometer defaults to 0 RPM if a malfunction in the engine speed signal circuit exists.

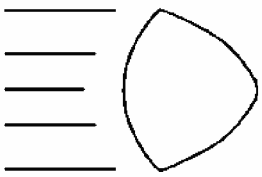
Voltmeter

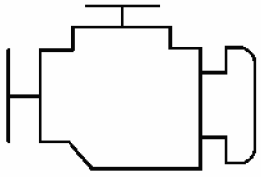
The IPC displays the system voltage as detected at the ignition 1 voltage input of the IPC. When the engine is ON, the gage should be between 10 and 16 volts.

INDICATOR/WARNING MESSAGE DESCRIPTION AND OPERATION

Indicators

Symbol	Description
	ABS: Refer to **ABS Description and Operation** in Anti-lock Brake System
	Air Bag: Refer to **SIR System Description and Operation** in SIR
	BRAKE: Refer to **Brake Warning System Description and Operation** in Hydraulic Brakes
	Charge: Refer to **Charging System Description and Operation** in Engine Electrical
CHECK GAGES	CHECK GAGES: Refer to Indicator/Warning Message Description

	and Operation
	Fasten Safety Belt: Refer to **Seat Belt System Description and Operation** in Seat Belts
GATE AJAR	GATE AJAR: Refer to **Rear Hatch/Gate Description and Operation (Gate Ajar Ind) Rear Hatch/Gate Description and Operation (General)** in Body Rear End
	High Beam: Refer to **Exterior Lighting Systems Description and Operation** in Lighting Systems
LOW FUEL	LOW FUEL: Refer to Indicator/Warning Message Description and Operation
OVERSPEED	OVERSPEED: Refer to Indicator/Warning Message Description and Operation
SECURITY	SECURITY: Refer to **Theft Systems Description and Operation** in Theft Deterrent
SERVICE 4WD	SERVICE 4WD: Refer to **Transfer Case Description and Operation** in Transfer Case - NVG 236-NP8 or **Transfer Case Description and Operation** in Transfer Case - NVG 233-NP1

 (Canada) SERVICE ENGINE SOON (U.S.)	Service Engine Soon: Refer to **Powertrain Control Module (PCM) Description** in Engine Controls - 4.3L
SHIFT	SHIFT: Refer to **Transmission System Description and Operation** in Manual Transmission
TOW/HAUL	TOW/HAUL: Refer to **Transmission Component and System Description** in Automatic Transmission - 4L60-E
	Turn Signals: Refer to **Exterior Lighting Systems Description and Operation** in Lighting Systems

CHECK GAGES

The instrument panel cluster (IPC) illuminates the CHECK GAGES indicator when any of the following indicators are illuminated:

- ABS
- Air bag
- BRAKE
- Charging system
- Low fuel
- MIL

LOW FUEL

The IPC illuminates the low fuel indicator when the IPC detects that the fuel level is approximately less than 21 percent. The IPC receives a class 2 message from the powertrain control module (PCM) indicating fuel level percent.

Overspeed

The IPC illuminates the overspeed indicator when the IPC detects that the vehicle speed is more than 120 km/h (75 mph).

DRIVER INFORMATION CENTER (DIC) DESCRIPTION AND OPERATION

The driver information center (DIC) consists of a multi-function electronic display placed in the overhead console. The DIC displays the following information:

- The vehicle fuel information
- The outside temperature
- The direction the vehicle is facing

The display parameters are cycled, changed, and acknowledged using the following 2 DIC buttons mounted at the side of the driver information center:

US/MET

Allows the display to switch between English and Metric units.

MODE

Used to toggle between OFF, COMP/TEMP and TRIP.

COMP/TEMP

COMP

In the Compass Mode, one of eight compass readings (N, NE, E, SE, S, SW, W, and NW) will be displayed to indicate the direction the vehicle is facing.

TEMP

In the Temperature Mode, the outside air temperature is displayed in either °C or °F. If the outside air temperature is below 3°C (37°F), the display will toggle between ICE and the current outside air temperature in 8 second increments.

TRIP

In the Trip Mode, the DIC displays the following information based on class 2 serial data:

AVG ECON

The DIC displays the average fuel economy since the last reset.

AVG SPEED

The DIC displays the average speed since the last reset.

FUEL USED

The DIC displays the amount of fuel used since the last reset.

INST ECON

The DIC displays the instantaneous fuel economy since the last second of driving.

RANGE

The DIC displays the estimated distance that can be travelled with the remaining fuel in the tank, based on the fuel economy for the last few hours of driving.

The display format for each mode is indicated in the following table:

Driver Information Center (DIC) Description and Operation

Displayed	Update Range	Reset Value	Units
AVG ECON	2 seconds	0.0	L/100 KM (MPG)
AVG SPEED	2 seconds	0.0	KM/H (MPH)
FUEL USED	0.38 L (0.1 Gal)	0.0	LTR (GAL)
INST ECON	1 second	-	L/100 KM (MPG)
RANGE	8 seconds	-	KM (MI)

AUDIBLE WARNINGS DESCRIPTION AND OPERATION

The audible warnings alert the driver of a system concern or a critical vehicle condition. The BCM generates the audible warnings through an internal speaker. The BCM emits audible warnings based on various inputs. If the BCM receives multiple audible warning requests, the warning with the highest priority sounds first.

Fasten Safety Belt Warning

The BCM activates the fasten safety belt audible warning, and also sends a class 2 message to the IPC to illuminate the fasten safety belt indicator when the following occurs:

- The ignition switch transitions to RUN.
- The seat belt is not buckled and the signal circuit is low.

If the seat belt is buckled while the chime is sounding, the chime stops. If the seat belt is unbuckled after the initial transition to RUN, the chime does not sound.

Key-In-Ignition Warning

The BCM activates the key-in-ignition audible warning when all of the following occurs:

- The driver door is open and the signal circuit is low.
- The key is in the ignition and the signal circuit is low.

The audible warning will sound for as long as the above conditions exist.

Lights On Warning

The BCM activates the lights on warning when the following occurs:

- The ignition is not in the RUN or START position.
- The headlamp switch is in the PARK or Head position.
- The instrument panel dimmer switch is not at the most dim setting.

The audible warning will sound for as long as the above conditions exist.

Low Fuel Warning

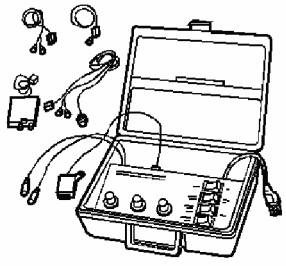
The BCM activates the low fuel warning when the following occurs:

- The ignition is in the RUN or START position.
- The fuel level is below 17 percent.
- The BCM receives a class 2 message from the PCM requesting an audible warning.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Special Tools

Illustration	Tool Number/ Description
	J 33431-C Signal Generator and Instrument Panel Tester